Vol. 940 Number 3

# OFFICIAL GAZETTE

of the

## UNITED STATES PATENT AND TRADEMARK OFFICE

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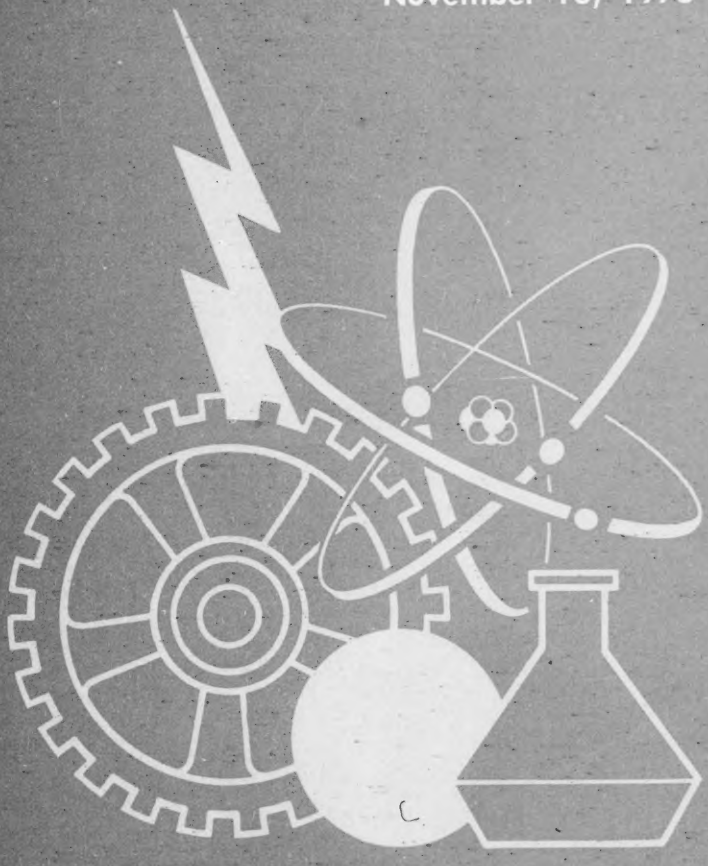
PATENTS

November 18, 1975



U.S. DEPARTMENT OF COMMERCE

Patent and Trademark Office

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# OFFICIAL GAZETTE of the
# UNITED STATES PATENT and TRADEMARK OFFICE

November 18, 1975 Volume 940 Number 3


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## Time for Filing Opposition to Marks Published in the November 4, 1975 Issue of the Official Gazette

It has come to the attention of the Patent and Trademark Office that there will be a delay at the Government Printing Office in mailing the Trademark Section of the OFFICIAL GAZETTE for November 4, 1975, due to production difficulties at the Government Printing Office. In view of the delay in mailing, the date of publication of those marks published for opposition in the November 4, 1975, OFFICIAL GAZETTE is deemed to be November 18, 1975. The period for opposing marks published in the November 4, 1975 issue will end on December 18, 1975.

B. A. MEANY,

Nov. 4, 1975. *Assistant Commissioner for Trademarks.*

**Certificates of Correction for the Week of Nov. 18, 1975**

| | | | |
|---|---|---|---|
| Re. 28,475 | 3,836,312 | 3,875,704 | 3,890,630 |
| 3,388,180 | 3,838,172 | 3,876,853 | 3,890,964 |
| 3,630,142 | 3,839,791 | 3,877,009 | 3,891,496 |
| 3,653,083 | 3,840,200 | 3,877,787 | 3,891,580 |
| 3,681,354 | 3,840,941 | 3,878,239 | 3,891,779 |
| 3,705,224 | 3,843,402 | 3,879,617 | 3,892,124 |
| 3,723,659 | 3,843,708 | 3,881,364 | 3,892,374 |
| 3,737,367 | 3,845,390 | 3,881,540 | 3,892,777 |
| 3,740,501 | 3,845,948 | 3,882,598 | 3,892,870 |
| 3,758,462 | 3,846,322 | 3,883,492 | 3,892,992 |
| 3,759,865 | 3,857,812 | 3,883,847 | 3,893,114 |
| 3,759,877 | 3,857,990 | 3,884,690 | 3,893,498 |
| 3,761,735 | 3,859,007 | 3,884,840 | 3,893,503 |
| 3,762,907 | 3,863,056 | 3,884,967 | 3,894,063 |
| 3,764,878 | 3,865,008 | 3,885,020 | 3,894,089 |
| 3,772,318 | 3,866,228 | 3,885,038 | 3,894,545 |
| 3,788,887 | 3,867,702 | 3,886,095 | 3,895,089 |
| 3,792,496 | 3,868,574 | 3,886,316 | 3,896,431 |
| 3,796,900 | 3,868,609 | 3,886,435 | 3,896,972 |
| 3,799,926 | 3,870,814 | 3,886,767 | 3,897,426 |
| 3,807,612 | 3,872,014 | 3,887,636 | 3,897,440 |
| 3,809,986 | 3,872,465 | 3,887,645 | 3,897,448 |
| 3,818,168 | 3,873,639 | 3,887,691 | 3,898,146 |
| 3,822,165 | 3,874,201 | 3,887,860 | 3,898,419 |
| 3,823,411 | 3,874,669 | 3,888,602 | 3,901,892 |
| 3,828,361 | 3,874,874 | 3,888,613 | 3,904,011 |
| 3,832,035 | 3,875,359 | 3,889,115 | 3,904,350 |
| 3,834,821 | | | |

# PATENT EXAMINING CORPS

**RENE D. TEGTMEYER, Assistant Commissioner**

**WILLIAM FELDMAN, Deputy Assistant Commissioner**

## CONDITION OF PATENT APPLICATIONS AS OF OCTOBER 25, 1975

| PATENT EXAMINING GROUPS | Actual Filing Date of Oldest New Case Awaiting Action |
|---|---|
| **CHEMICAL EXAMINING GROUPS** | |
| GENERAL CHEMISTRY AND PETROLEUM CHEMISTRY, GROUP 110—S. N. ZAHARNA, Director. Inorganic Compounds: Inorganic Compositions; Organo-Metal and Organo-Metalloid Chemistry; Metallurgy; Metal Stock; Electro Chemistry: Batteries; Hydrocarbons; Mineral Oil Technology; Lubricating Compositions; Gaseous Compositions; Fuel and Igniting Devices. | 1-30-75 |
| GENERAL ORGANIC CHEMISTRY, GROUP 120—A. L. LEAVITT, Director. Heterocyclic, Amides; Alkaloids; Azo; Sulfur: Misc. Esters; Carbohydrates; Herbicides; Poisons; Medicines; Cosmetics; Steroids; Oxo and Oxy; Quinones; Acids; Carboxylic Acid Esters; Acid Anhydrides; Acid Halides. | 11-13-74 |
| HIGH POLYMER CHEMISTRY, PLASTICS AND MOLDING, GROUP 140—A. P. KENT, Director. Synthetic Resins; Rubber; Proteins; Macromolecular Carbohydrates; Mixed Synthetic Resin Compositions; Synthetic Resins With Natural Polymers and Resins; Natural Resins; Reclaiming; Pore-Forming; Compositions (Part) e.g.: Coating; Molding; Ink; Adhesive and Abrading Compositions; Molding, Shaping, and Treating Processes. | 1-6-75 |
| COATING AND LAMINATING, BLEACHING, DYEING AND PHOTOGRAPHY, GROUP 160—R. FRIEDMAN, Director. Coating; Processes and Misc. Products: Laminating Methods and Apparatus; Stock Materials; Adhesive Bonding; Special Chemical Manufactures; Special Utility Compositions: Bleaching; Dyeing and Photography. | 1-6-75 |
| SPECIALIZED CHEMICAL INDUSTRIES AND CHEMICAL ENGINEERING, GROUP 170—H. S. VINCENT, Director. Fertilizers; Foods; Fermentation; Analytical Chemistry; Reactors; Sugar and Starch; Paper Making; Glass Manufacture; Gas; Heating and Illuminating; Cleaning Processes; Liquid Purification; Distillation; Preserving; Liquid, Gas, and Solid Separation; Gas and Liquid Contact Apparatus; Refrigeration; Concentrative Evaporators; Mineral Oils Apparatus; Misc. Physical Processes. | 1-7-75 |
| **ELECTRICAL EXAMINING GROUPS** | |
| INDUSTRIAL ELECTRONICS, PHYSICS AND RELATED ELEMENTS, GROUP 210—W. L. CARLSON, Director. Generation and Utilization; General Applications; Conversion and Distribution; Heating and Related Art Conductors; Switches; Photography; Motion Pictures: Illumination: Horology; Acoustics; Recorders; Weighing Scales. | 12-9-74 |
| SPECIAL LAWS ADMINISTRATION, GROUP 220—C. D. QUARFORTH, Director. Ordnance, Firearms and Ammunition; Radar, Underwater Signalling, Directional Radio, Torpedoes, Seismic Exploring, Radio-Active Batteries; Nuclear Reactors, Powder Metallurgy, Rocket Fuels; Radio-Active Material. | 10-18-74 |
| INFORMATION TRANSMISSION, STORAGE AND RETRIEVAL, GROUP 230—J. F. COUCH, Director. Communications; Multiplexing Techniques; Facsimile; Data Processing, Computation and Conversion; Storage Devices and Related Arts. | 2-3-75 |
| RECEPTACLES, SANITATION AND CLEANING, WINDING, AND MEASURING, GROUP 240—N. ANSHER, Director. Receptacles; Joint Packing; Conduits; Plumbing Fixtures; Textile Spinning; Food; Agitating; Cleaning; Pressing; Geometrical Instruments; Sound Recording; Winding and Reeling; Measuring and Testing; Indicating. | 4-2-75 |
| ELECTRONIC COMPONENT SYSTEMS AND DEVICES, GROUP 250—L. FORMAN, Director. Semi-Conductor and Space Discharge Systems and Devices; Electronic Component Circuits; Wave Transmission Lines and Networks; Optics; Radiant Energy; Measuring. | 12-5-74 |
| DESIGNS, GROUP 290—C. D. QUARFORTH, Director. Industrial Arts; Household, Personal and Fine Arts. | 7-3-74 |
| **MECHANICAL EXAMINING GROUPS** | |
| HANDLING AND TRANSPORTING MEDIA, GROUP 310—D. J. STOCKING, Director. Conveyors; Hoists; Elevators; Article Handling Implements; Store Service; Sheet and Web Feeding; Dispensing; Fluid Sprinkling; Fire Extinguishers; Coin Handling; Check Controlled Apparatus; Classifying and Assorting Solids; Boats; Ships; Aeronautics; Motor and Land Vehicles and Appurtenances; Brakes; Railways and Railway Equipment. | 2-7-75 |
| MATERIAL SHAPING, ARTICLE MANUFACTURING, TOOLS, GROUP 320—S. S. MATTHEWS, Director. Manufacturing Processes, Assembling, Combined Machines, Special Article Making; Metal Deforming; Sheet Metal and Wire Working; Metal Fusion—Bonding, Metal Founding; Metallurgical Apparatus; Plastics Working Apparatus; Plastic Block and Earthenware Apparatus; Machine Tools for Shaping or Dividing; Work and Tool Holders, Woodworking; Tools; Cutlery; Jacks. | 2-5-75 |
| AMUSEMENT, HUSBANDRY, PERSONAL TREATMENT, INFORMATION, GROUP 330—G. M. FORLENZA, Director. Amusement and Exercising Devices; Projectors; Animal and Plant Husbandry; Butchering; Earth Working and Excavating; Fishing, etc.; Tobacco; Artificial Body Members; Dentistry; Jewelry; Surgery; Toiletry; Printing; Typewriters; Stationery; Information Dissemination. | 2-11-75 |
| HEAT, POWER, AND FLUID ENGINEERING, GROUP 340—B. R. GAY, Director. Power Plants; Combustion Engines; Fluid Motors; Reaction Motors; Pumps; Rotary Engines and Pumps; Heat Generation and Exchange; Refrigeration; Ventilation; Drying; Temperature and Humidity Regulation; Machine Elements; Couplings; Gearing; Bearings; Clutches; Power Transmission; Fluid Handling and Control; Lubrication. | 1-6-75 |
| GENERAL CONSTRUCTIONS, TEXTILES AND MINING, GROUP 350—M. M. NEWMAN, Director. Joints; Fasteners; Rod, Pipe and Electrical Connectors: Miscellaneous Hardware; Locks; Building Structures; Closure Operators; Bridges; Closures: Earth Engineering; Drilling; Mining; Furniture; Supports; Cabinet Structures; Centrifugal Separations; Coating; Textiles; Apparel and Shoes; Sewing Machines. | 4-11-75 |

**Expiration of patents:** The patents within the range of numbers indicated below expire during November 1975, except those which may have expired earlier due to shortened terms under the provisions of Public Law 690, 79th Congress, approved August 8, 1946 (60 Stat. 940) and Public Law 619, 83rd Congress, approved August 23, 1954 (68 Stat. 764), or which may have had their terms curtailed by disclaimer under the provisions of 35 U.S.C. 253. Other patents, issued after the dates of the range of numbers indicated below, may have expired before the full term of 17 years for the same reasons, or have lapsed under the provisions of 35 U.S.C. 151.

Patents..... Numbers 2,858,537 to 2,862,204 inclusive
Plant Patents..... Numbers 1,768 to 1,774 inclusive

# REISSUES

## GRANTED NOVEMBER 18, 1975

Matter enclosed in heavy brackets [ ] appears in the original patent but forms no part of this reissue specification; matter printed in italics indicates the additions made by reissue.

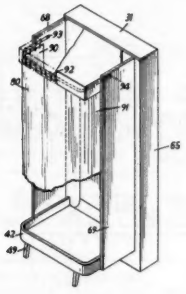
### Re. 28,613
### SHOWER CABINET

**Harry Collett Bolt, Penn Road, Knotty Green, Beaconsfield, Buckinghamshire, England**

**Original No. 3,646,590, dated Feb. 29, 1972, Ser. No. 27,921, Apr. 13, 1970. Application for reissue Apr. 23, 1972, Ser. No. 353,877**

**Int. Cl.** A47k *3/23*

**U.S. Cl. 4—146** **15 Claims**



1. A shower cabinet which is collapsible so that when not in use it occupies a space of small front-to-back depth but can readily be opened to accommodate a person in a waterproof space including a back structure of small depth, a tray pivotally attached to the back structure and movable from a vertical position adjacent the back structure to an extended approximately horizontal position near floor level, a roof attached to the back structure and movable from a collapsed position adjacent the back structure to an extended approximately horizontal overhead position, and two pivoted rigid sidewalls attached to the back structure movable from collapsed positions adjacent the back structure to extended positions, approximately at right angles to the back structure, means effecting a waterproof engagement between the two sidewalls when extended and the tray, and a front closure member movable from a position adjacent the back structure to a position at the front of the cabinet in the open condition.

---

### Re. 28,614
### METHOD AND APPARATUS FOR TRANSPORTING AND LAUNCHING AN OFFSHORE TOWER

**Jesse W. Crout; Albert M. Koehler, and Larry K. Shaw, all of Houston, Tex., assignors to Brown & Root, Inc., Houston, Tex.**

**Original No. 3,823,564, dated July 16, 1974, Ser. No. 336,276, Feb. 27, 1973. Application for reissue Jan. 9, 1975, Ser. No. 539,725**

**Int. Cl.**[2] **E02B** *17/02;* **B63B** *35/40*

**U.S. Cl. 61—46.5** **32 Claims**

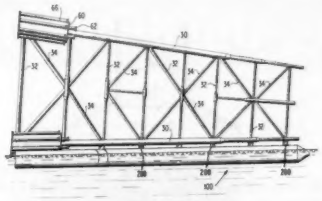
1. An apparatus for transporting an offshore tower, of the type having inwardly and upwardly sloping legs, generally upon the surface of a body of water, controllably righting the offshore tower onto the bed of the body of water at a preselected marine site and controllably releasing the offshore tower at the preselected marine site comprising:

watertight buoyancy means for supporting the offshore tower in a generally horizontal posture substantially above the surface of the body of water;

connecting means extending between said watertight buoyancy means at spaced intervals along the lateral extent of the offshore tower for connecting said watertight buoyancy means to a lateral surface of the offshore tower;

a plurality of bulkheads positioned within the interior of said watertight buoyancy means for dividing said buoyancy means into discrete compartments for facilitating the regulation of buoyancy within said watertight buoyancy means and the righting of the offshore tower onto the bed of the body of water; and

said connecting means extending between said watertight buoyancy means and the offshore tower, at a base portion



thereof, comprises, at least one pivotal connection assembly having a pivotal axis extending transverse to a central longitudinal axis of the offshore tower so that the means extending between said watertight buoyancy means and the offshore tower may be released with the exception of said at least one pivotal connection assembly and the watertight buoyancy means may pivot away from the inwardly and upwardly sloping legs of the righted offshore tower about the said at least one pivotal connection assembly before the watertight buoyancy member is completely released from the righted offshore tower.

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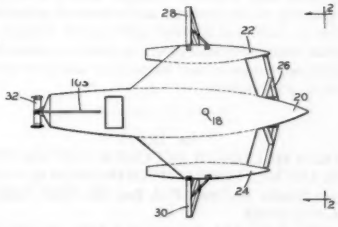
### Re. 28,615
### HYDROFOIL SAILING CRAFT

**David A. Keiper, P.O. Box 71, Sausalito, Calif. 94965**

**Original No. 3,561,388, dated Feb. 9, 1971, Ser. No. 822,578, May 7, 1969. Application for reissue Feb. 7, 1973, Ser. No. 330,201**

**Int. Cl.**[2] **B63B** *1/28*

**U.S. Cl. 114—66.5 H** **12 Claims**



1. In a hydrofoil trimaran, a central hull and a pair of pontoon hulls symmetrically disposed on opposite sides of the central hull and spaced therefrom and sail propulsion means, a bow hydrofoil truss structure having a symmetrically disposed dihedral foil element with oppositely inclined lifting surfaces, with strut means, said structure being pivotally mounted upon the opposite sides of the central hull and the pontoon hulls above the normal water line of said hulls on a substantially common pivotal axis, means for securing the truss structure in a generally vertical plane

with lifting surfaces inclined to provide a positive angle of attack and positive lift, a lateral hydrofoil unit applied to each of the pontoon hulls, having lifting foils inclined outwardly and upwardly, and laterally of the center of thrust of the sail propulsion means, and a stern foil unit having lifting foils.

---

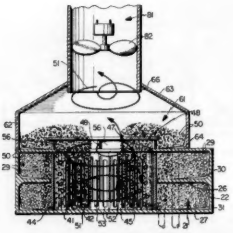
## Re. 28,616
## MASS CONTACT BETWEEN MEDIA OF DIFFERENT DENSITIES

**Eugene S. Yankura, Branford, Conn., assignor to Entoleter, Inc., New Haven, Conn.**

**Original No. 3,566,582, dated Mar. 2, 1971, Ser. No. 813,634, Apr. 4, 1969. Application for reissue Dec. 3, 1974, Ser. No. 529,249**

**Int. Cl.[2] B01D** *47/00*

**U.S. Cl. 55—92** **35 Claims**



**1.** A method of effecting mass contact between a first material in continuous phase and a second material in discontinuous phase particulate form having a substantially greater density than said first material, comprising feeding said first material into a generally cylindrical chamber having a louvered wall of substantially circular overall configuration with louver surfaces oriented at an angle between orthogonal and tangent to said circular configuration, said chamber having an exit port at one end, said first material being fed into said chamber through said louvered wall and being caused by said louver surfaces to flow spirally in said chamber to said exit port, entraining said second material in said flow of said first material, whereby centrifugal and centripetal forces are imparted to the particles of said second material in said chamber, **[and]** increasing the net average centripetal force of said entrained particles *in said chamber* by *continually* removing particles of said second material having a high net centrifugal force outwardly from said chamber through said louvered wall **[.]** *and imparting to the other of said entrained particles in said chamber on statistical average approximate balance between centripetal and centrifugal forces to form a sustained densely populated suspension of said particles in said flow of said first material in said chamber.*

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## Re. 28,617
## STEREO MULTIPLEX DECODING SYSTEM WITH A PHASE LOCKED LOOP SWITCHING SIGNAL CONTROL

**Clarence Hunter McShan, P.O. Box 392, Bluff Point, Northport, N.Y. 11768**

**Original No. 3,584,154, dated June 8, 1971, Ser. No. 737,511, June 17, 1968. Application for reissue May 22, 1974, Ser. No. 472,347**

**Int. Cl.[2] H04H** *5/00*

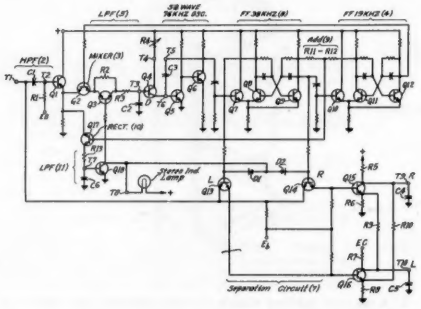
**U.S. Cl. 179—15 BT** **25 Claims**

**1.** In a system, *particularly adaptable for integrated circuitry* for decoding a composite stereophonic signal having signal components in a band of lower frequencies, signal components in a separate band of higher frequencies and a pilot subcarrier signal at a frequency intermediate said bands, the combination of

first filter means effective to pass said pilot subcarrier signal and at least attenuate frequencies below said pilot subcarrier signal, control signal responsive *electrical* means for generating a first local signal with a frequency that is a multiple of the frequency of said pilot subcarrier signal,

frequency divider means responsive to said local signal generating means for generating at least one other local signal in phase locked relation to said first local signal and of the same frequency as said pilot subcarrier signal,

signal sampling means connected to receive said pilot subcarrier signal from said filter means and rendered operative periodically by said other local signal for supplying to said first local signal generating means a control signal representative of periodically selected samples of said pilot subcarrier signal so as to maintain said first and other signals in phase locked relation to said pilot subcarrier signal,



second filter means **[interposed between]** *coupled to* said sampling means **[and]** *with a constant driving impedance and connected to* said control signal responsive generating means for passing to the latter only signals of frequency less than or equal to the difference between the frequency of said pilot subcarrier signal and the frequency of said other local signal, **[and]** *said control signal responsive means, frequency divider means, signal sampling means and second filter means forming a phase lock loop that will accept unattenuated modulation components of the composite signal and respond only to the pilot subcarrier to produce a control signal* means jointly responsive to said composite signal and to a multiple of said other local signal for separating said composite signal into different information containing components, *and de-emphasis means in each output of the decoder for restoring the signal characteristics in original form.*

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## Re. 28,618
## SOLID-STATE POWER SUPPLY SYSTEM FOR ROTATING ANODE X-RAY TUBES

**Louis L. Fiocca, Bensenville, Ill., assignor to Advanced Instrument Development, Inc., Melrose Park, Ill.**

**Original No. 3,641,408, dated Feb. 8, 1972, Ser. No. 66,348, Aug. 24, 1970. Application for reissue Feb. 5, 1974, Ser. No. 440,063**

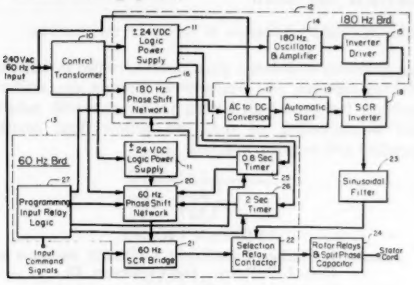
**Int. Cl. H02p** *5/40*

**U.S. Cl. 318—227** **17 Claims**

**1.** [An induction motor supply system such as used for powering rotating anode X-ray tubes, wherein the X-ray tube anode is either driven by the motor rotor or is the motor rotor, said power supply system comprising a first solid-state power source for supplying normal power required for driving the rotor of said motor at a first running speed, a second solid-state power source for supplying normal power required for driving the rotor of said motor at a second running speed,

said second speed being higher than said first speed,

boost means for increasing the power to the motor for a predetermined period of time above the normal running power to accelerate the rotor while attaining said first and second running speeds,




means for decreasing said power to the normal running power after said predetermined period of time, and

means for selectively connecting the stator of said motor to either said first or said second power sources.]

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## Re. 28,619

## UNITARY SERIES SPARK GAP WITH ALIGNED APERTURES

**Chester J. Kawiecki, Santa Barbara, Calif., assignor to Joslyn Mfg. and Supply Co., Chicago, Ill.**

**Original No. 3,535,825, dated Oct. 20, 1970, Ser. No. 713,919, Mar. 18, 1968. Continuation of Ser. No. 298,014, Oct. 16, 1972. Application for reissue Nov. 12, 1973, Ser. No. 414,858**

**Int. Cl. H05g** *41/14*

**U.S. Cl. 315—203** **15 Claims**

1. A spark-gap device suitable for providing transient protection to a line above a predetermined voltage level, said device comprising:

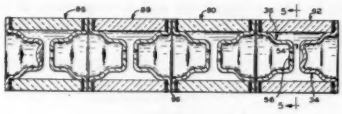
a first pair of conductive electrodes,

insulating spacer means positioning said first pair of electrodes with opposed portions thereof in facing relation for defining a first gap therebetween adapted to break down and support an arc discharge,

a second pair of conductive electrodes,

insulating spacer means positioning said second pair of electrodes with opposed portions [therof] *thereof* in facing relation for defining a second gap therebetween adapted to break down and support an arc discharge,

one of said second pair of electrodes being electrically connected to one of said first pair of electrodes for providing a series circuit including said gaps, said device




being constructed so that an arc discharge across one gap causes illumination of the other gap,

and a first enclosed chamber substantially separate from the region of said gaps and communicating with the region of [at least one of] said gaps to promote extinguishing of an arc discharge across the said one of said gaps after the cessation of an over-voltage condition across said gaps in series[.],

*wherein said insulating spacer means cooperate with said electrodes to enclose the first and second gaps in second and third separate chambers respectively, said insulating spacer means being joined to the respective pairs of electrodes with which they form chambers to hermetically seal said second and third chambers except for communication with said first chamber.*

# PLANT PATENTS

## GRANTED NOVEMBER 18, 1975

**Illustrations for plant patents are usually in color and therefore it is not practicable to reproduce the drawing.**

**3,805**

### LILY PLANT

**Ted T. Kirsch, Sitkum Rte., Box 142, Myrtle Point, Oreg. 97458**

**Filed Oct. 15, 1974, Ser. No. 514,796**

**Int. Cl. A01h** *5/00*

**U.S. Cl. Plt.—68** **1 Claim**

1. A new and distinct variety of Asiatic hybrid lily plant substantially as herein shown and described characterized by the color, form and arrangement of its bright yellow flowers, by its profuse production of flower buds which bloom progressively to provide an extended blooming period, and by the long lasting quality of the blooms on the plant and as cut flowers.

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**3,806**

### PEACH TREE

**Merle M. Fountain, 1148 Meikle Road, Hickman, Calif. 95323**

**Filed Nov. 25, 1974, Ser. No. 527,163**

**Int. Cl. A01h** *5/03*

**U.S. Cl. Plt.—43** **1 Claim**

1. A new and distinct variety of peach tree, substantially as illustrated and described, characterized by blooming profusely with large, pink, double, ruffled flowers, and bearing regularly and productively medium size, uniform, globose, freestone fruit having yellow skin with substantial overspreading of red, and yellow flesh partially streaked and mottled with red.

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**3,807**

### AFRICAN VIOLET

**Arnold W. Fischer, Isernhagen, Germany, assignor to Geo. J. Ball, Inc., West Chicago, Ill.**

**Filed Dec. 18, 1974, Ser. No. 534,141**

**Int. Cl. A01h** *5/00*

**U.S. Cl. Plt.—69** **1 Claim**

1. A new and distinct variety of African violet plant, substantially as herein shown and described, characterized by the large size of its dark blue flowers which are borne on sturdy upright stems and are well spaced to fully cover the center of the plant, its vigorous growth habit and profuse year around flowering, and its long-lasting flowering cycle.

# PATENTS

## GRANTED NOVEMBER 18, 1975

### ERRATA

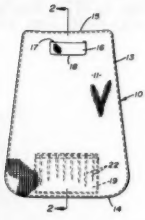
| For CLASS | See PATENT NO. |
|---|---|
| 228–185 | 3,919,764 |
| 089–132 | 3,919,921 |
| 112–166 | 3,919,942 |
| 271–118 | 3,919,972 |
| 280–150.5 | 3,920,094 |
| 292–207 | 3,920,110 |
| 293–097 | 3,920,111 |
| 242–055 | 3,920,136 |
| 250–202 | 3,920,316 |
| 428–109 | 3,920,339 |
| 423–580 | 3,920,395 |
| 204–110 | 3,920,403 |
| 204–092 | 3,920,551 |
| 264–046.9 | 3,920,610 |
| 428–395 | 3,920,658 |
| 423–276 | 3,920,825 |
| 427–245 | 3,920,875 |
| 424–078 | 3,920,883 |
| 219–523 | 3,920,963 |
| 235–061.11 D | 3,921,196 |

# PATENTS

NOTE – A cross reference listing of applications published under Trial Voluntary Protest Program on January 28, 1975 is located in the back of this Issue. These entries will be in numerical order by document publication number.

## GENERAL AND MECHANICAL

**3,919,721**
**LAP ROBE**
**Ruth Earhart, 1278 Narragansett Park, Lexington, Ky. 40402**
**Filed Nov. 1, 1974, Ser. No. 519,871**
**Int. Cl.[2] A41D** *3/00*
**U.S. Cl. 2—69** **2 Claims**



**1.** The combination of a lap robe and a pair of pockets thereon, said lap robe comprising a rectangular, single thickness, panel of blanket material having an outer side and an inner side, one end of said panel of blanket material forming a top end and the opposite end thereof forming a bottom end, one of said pockets being affixed to the outer side of said panel of blanket material adjacent said top end and opening toward the same and the other of said pockets being affixed to an area on the inner side of said panel of blanket material adjacent the bottom end thereof and opening toward said top end, said other pocket comprising a secondary panel of blanket material substantially larger than the area of the inner side of said rectangular panel of blanket material to which said other pocket is affixed, said secondary panel of blanket material being pleated and having means for resiliently urging said other pocket toward said inner side of said panel of blanket material.

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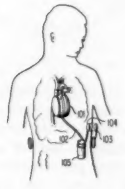
**3,919,722**
**TOTALLY IMPLANTABLE ARTIFICIAL REPLACEMENT HEART**
**Lowell T. Harmison, Bethesda, Md., assignor to The United States of America as represented by the Secretary of the Department of Health, Education and Welfare, Washington, D.C.**
**Filed Mar. 6, 1973, Ser. No. 338,611**
**Int. Cl.[2] A61F** *1/24*
**U.S. Cl. 3—1.7** **13 Claims**

**1.** A totally implantable replacement heart comprising:
a blood pumping means for pumping blood to and receiving blood from the lungs, and pumping blood to the venous system and receiving blood from the arterial system;
pump drive means for periodically activating said pumping means at a specific activation rate;
heart rate sensing means for detecting the physiological demand of the body for a supply of blood thereto and for providing an output signal in response to the physiological demand, said sensing means including detection means associated with said pumping means for sensing when a predetermined volume has been pumped by said pumping means during any activation thereof; and



heart rate control means, connected to said means for periodically activating said pumping means and said sensing means, for controlling the activation rate of said pumping means in response to said output of said sensing means, said control means including:
a computer means for continuously monitoring the activation rate of said pumping means and said output signal from said sensing means, and after every series of a predetermined number of activations of said pumping means generating an output signal to either increase, decrease or maintain the activation rate.

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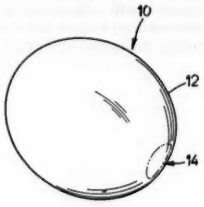
**3,919,723**
**BONE SHAFT OR BONE JOINT PROSTHESIS AND PROCESS**
**Gunther Heimke, Mannheim; Hans Walter Hennicke, Clausthal-Zellerfeld, and Ernst Gugel, Rodental-Oeslau, all of Germany, assignors to Friedrichsfeld GmbH Steinzeug-und Kunstostoffwerke, Mannheim, Germany**
**Filed May 20, 1974, Ser. No. 471,480**
**Int. Cl.[2] A61F** *1/24*
**U.S. Cl. 3—1.9** **10 Claims**

**1.** The bone shaft or bone joint prosthesis which comprises a compacted $Al_2O_3$ ceramic, cement-free unitary implant and at least one substance capable of releasing bone-growth stimulating ionic material selected from the group consisting of lithium ions, boron ions, carbon ions, fluorine ions, sodium ions, magnesium ions, silicon ions, phosphorus ions, potassium ions, calcium ions and mixtures thereof, incorporated only at and near at least a portion of the surface of said $Al_2O_3$ implant, said substance stimulating and controlling the attachment of bone tissue to the portions of the surface of said implant wherein said substance is incorporated.

## 3,919,724
## IMPLANTABLE PROSTHESIS HAVING A SELF-SEALING VALVE

David H. Sanders, Deerfield, Ill.; Henry W. Lynch, and Sennen Uy, both of Racine, Wis., assignors to Medical Engineering Corporation, Racine, Wis.

Filed June 7, 1974, Ser. No. 477,307
Int. Cl.[2] A61F 1/24; A41C 3/10
U.S. Cl. 3—36 4 Claims

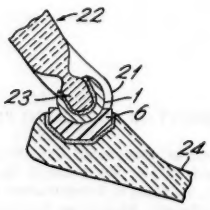



3. An implantable breast prosthesis comprising a flexible container having the shape of a human breast, a self-sealing valve provided on the edge of the inside surface of the container, said valve including a shell of organosiloxane copolymer material, a self-sealing gel completely filling said shell and a radiopaque material wherein said valve can be located by X-ray after implantation, and a saline solution completely filling said container.

## 3,919,725
## ENDOPROSTHETIC ELBOW JOINT DEVICES

Sydney Alan Vasey Swanson, Carshalton, and Brian Arnold Roper, London, both of England, assignors to National Research Development Corporation, London, England

Filed Nov. 30, 1973, Ser. No. 420,578
Claims priority, application United Kingdom, Nov. 30, 1972, 55350/72
Int. Cl.[2] A61F 1/24
U.S. Cl. 3—1.91 9 Claims

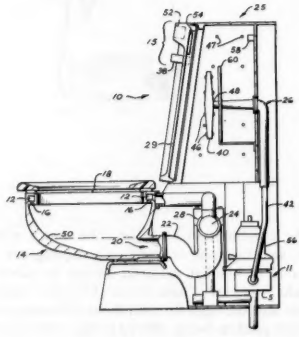


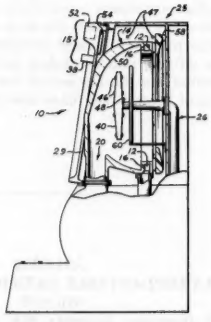

1. A total endoprosthetic elbow joint device, comprising:
a humeral component in the form of a cap having a symmetrical open-ended, entirely U-shaped channel relative to a longitudinal axis therethrough, said humeral component defining an outer bearing surface of circular arcuate cross section centered on said axis, and defining an inner fixation surface forming a slot encompassing said axis; and
an ulnar component in the form of a socket having an open-ended generally U-shaped channel relative to said axis, said ulnar component defining an inner bearing surface substantially complementary to and engaged with at least a longitudinal portion of said outer bearing surface of said humeral component for mutual articulation about said axis between said bearing surfaces, and defining an outer fixation surface, said inner bearing surface and the bordering parts of said outer fixation surface being convergently tapered towards each of the longitudinal ends of said ulnar component, said fixation surfaces being adapted to be secured relative to respective bone ends by a cementitious gap filling medium.

## 3,919,726
## WATER CLOSET HAVING A BOWL AND A WASH MEANS

Stanley J. Godwin, Schenectady, and Richard M. Lund, Scotia, both of N.Y., assignors to General Electric Company, Louisville, Ky.

Filed Dec. 4, 1974, Ser. No. 529,536
Int. Cl.[2] E03D 1/00, 3/00, 5/00
U.S. Cl. 4—10 8 Claims





1. A water closet comprising:
a base;
a bowl attached to said base in fluid-flow communication with a sewer;
a cabinet-type enclosure mounted in enclosing relationship to said bowl and dimensioned to receive said bowl;
a plurality of spray means located within said cabinet-type enclosure, said spray means being adapted to distribute a washing liquid within said enclosure;
water-handling means for supplying water to said spray means and for flushing of said water closet; and

control means to effect flushing and cleaning of said water closet;

said water closet being further defined in that at least one of said bowl or said cabinet-type enclosure is pivotally movable between a first position in which the bowl is ready for use and a second position in which the bowl is received within said cabinet-type enclosure in liquid-tight fashion for cleaning thereof.

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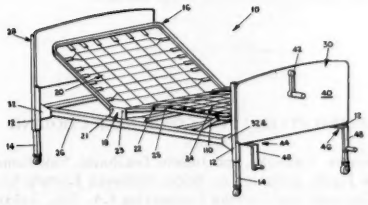
**3,919,727**

## HIDDEN ADJUSTMENT MEANS FOR A BED

**G. William Paine, Manistee, Mich., assignor to Joerns Furniture Company, Stevens Point, Wis.**

**Filed Aug. 12, 1974, Ser. No. 496,512**
**Int. Cl.[2] A61G** *07/10*
**U.S. Cl. 5—63** **15 Claims**



**1.** In an adjustable bed having a supportive framework including a pair of generally parallel horizontal rail members; head and foot members having legs for supporting said rail members; an articulated surface having at least one adjustable section supported on said rail members; and actuating means for pivotally moving said adjustable section relative to said rail members; the improvement comprising: at least one of said rail members forming a channel extending along the length of the bed; said actuating means including a first member positioned in said channel and a second member also positioned in said channel and engaging and being extendible and retractable with respect to said first member along at least a portion of the length of said channel, means for extending and retracting said second member within said channel with respect to said first member; and connecting means extending through at least a portion of said channel for connecting said second member to said adjustable section to pivot said section with respect to said rail members.

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**3,919,728**

## DOUBLE LOCKING GATE SHOE AND TRIP FOR CRIB DROP SIDES

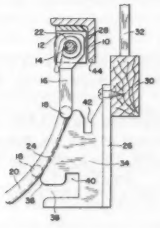
**Robert G. Bryant, Gardner, Mass., assignor to Gem Industries, Inc., Gardner, Mass.**

**Filed Nov. 18, 1974, Ser. No. 524,498**
**Int. Cl.[2] A47D** *9/00*
**U.S. Cl. 5—100** **2 Claims**

**1.** A double locking gate shoe and trip for the drop side of a crib having a stabilizer bar and a drop side adjacent thereto, a pivotable trip on the stabilizer bar and a spring urging the trip in a direction toward the drop side,

a gate shoe on the drop side, said gate shoe including a rearwardly extending flange having an inclined edge thereon, said inclined edge extending downwardly to the rear, toward the trip, an opening at the lower end of said inclined edge, said opening extending forwardly and then upwardly,

and a portion on said trip being urged into said opening by



the spring, said trip portion entering the upright part of the opening upon manual release of the drop side and consequent drop by gravity thereof, whereby it is necessary to raise the drop side slightly and to provide a simultaneous rearward presure on the trip to retract it from the gate shoe,

wherein the spring maintains the trip in the path of the inclined edge of the flange when the drop side is being raised, the inclined edge acting like a cam and pressing the trip gradually rearwardly against the action of the spring.

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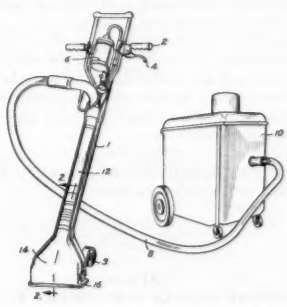
**3,919,729**

## METHOD FOR CLEANING CARPETS

**Bernard M. Cannan, Downers Grove, Ill., assignor to Service Master Industries, Inc., Downers Grove, Ill.**

**Filed Aug. 1, 1974, Ser. No. 493,917**
**Int. Cl.[2] B08B** *3/08, 3/10, 5/04, 7/04*
**U.S. Cl. 8—158** **5 Claims**



**1.** A method for cleaning a soiled carpet which comprises: applying to the soiled carpet, 2–3 gallons of a detergent solution per 100 ft² of carpet,

said detergent solution containing ⅛ ounce to 2 ounces of a concentrated detergent solution per gallon of solution, said concentrated detergent comprising 14 weight % sodium lauryl sulfate wherein the sulfate is 30% active;

concurrently contacting the soiled, detergent-containing carpet with a high velocity airstream to produce a low stability, wet flowable foam and to suspend, in said foam, soil removed from the soiled carpet; and,

concurrently, withdrawing said foam from the carpet to provide a cleaned carpet surface.

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**3,919,730**

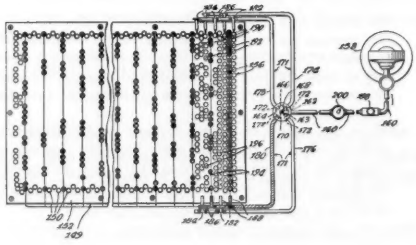
**INFLATABLE BODY SUPPORT**

**John J. Regan, 2316 N. Harlem Ave., Elmwood Park, Ill. 60635**

**Substitute of abandoned Ser. No. 243,935, Apr. 14, 1972, which is a continuation-in-part of Ser. No. 866,934, Oct. 16, 1969, Pat. No. 3,656,190. This application Aug. 14, 1974, Ser. No. 497,240**

**Int. Cl.[2] A47C** *27/08*

**U.S. Cl. 5—348 R** **11 Claims**



**1.** In a body support having a base, a plurality of body support elements mounted on and extending upwardly from said base, wherein the improvement comprises:

each body support element including a retractable lower section movable between extended and retracted positions, a body conforming upper section, said upper section having a seat portion, a resilient means carried on the seat portion, a body engaging member carried by said resilient means, said body engaging member slidable with respect to said seat portion to conform the body engaging members of each support element independently of the lower section to the contour of a body supported on the plurality of elements; and

means for selectively moving the lower sections of the plurality of body support elements between their respective extended and retracted positions.

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**3,919,731**

**SHOE STRAP HOLDER FOR DISPLAY PURPOSES**

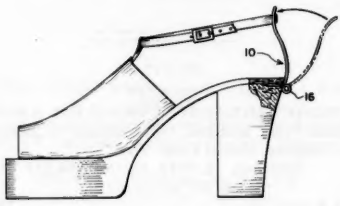
**Ben Walters, 4600 E. 11th Ave., Hialeah, Fla. 33013**

**Filed Dec. 9, 1974, Ser. No. 530,977**

**Int. Cl.[2] A43D** *00/00*

**U.S. Cl. 12—1 R** **10 Claims**

**1.** A display device for use with a shoe having a heel portion and an adjustable heel strap comprising a continuous strand of flexible material having a base adjacent one end and a generally longitudinally extending portion containing an opposite end, said base including at least one loop of such strand, said one end being pointed and being of a length sufficient to be



urged into the heel of a shoe for jamming the loop against the outer face of the heel when the opposite end engages the heel strap and the strand is flexed, so that the strap is maintained taut and the pointed end is urged into the heel.

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**3,919,732**

**DESCALING SYSTEM FOR CONDENSER COOLING TUBES**

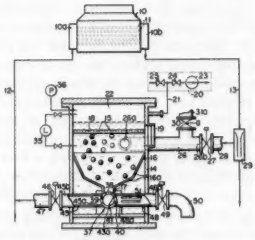
**Yoshio Honma, Yokosuka, and Junichi Takahashi, Yokohama, both of Japan, assignors to Tokyo Shibaura Electric Co., Ltd., Kawasaki and Toshiba Engineering Co., Ltd., Tokyo, both of, Japan**

**Filed Oct. 24, 1974, Ser. No. 517,614**

**Claims priority, application Japan, Nov. 1, 1973, 48-125903[U]**

**Int. Cl.[2] F28G** *1/12*

**U.S. Cl. 15—3.51** **5 Claims**



**1.** A descaling system for condenser cooling tubes designed to conduct a large number of descaling elements through the cooling tubes from a cooling water feed line and draw out used descaling elements from the discharge line of cooling water, characterized in that said descaling system comprises a tightly closed vessel; a cage member whose outer peripheral wall is fixed to the inner peripheral wall of the vessel and whose bottom end is fitted with a pipe for passage of descaling elements, and which acts as a receptacle for the descaling elements and allows the free passage of cooling water alone; a descaling element supply pipe whose forward end communicates with the vessel and whose rear end communicates with a cooling water discharge line; evacuating means for deaerating the vessel; a 3-port switching valve connected to the pipe fitted to the bottom end of the cage member; a feed pipe, one

end of which is connected to the 3-port switching valve for communication with the pipe of the cage member by selective operation of said valve and the other end of which communicates with a cooling water feed line; and a discharge pipe for drawing out descaling elements from the vessel, one end of said discharge pipe being connected to the 3-port switching valve for communication with the pipe of the cage member by selective operation of said valve and the other end of said discharge pipe extending outside of the vessel, and said discharge pipe further having its peripheral wall bored with openings for conducting the cooling water of the vessel into said pipe.

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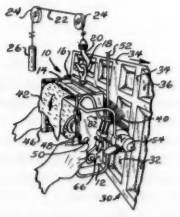
**3,919,733**

## GLAZE WIPING APPARATUS FOR GRAINING FURNITURE

**Kenneth J. Susnjara, Santa Claus, Ind., assignor to Thermwood Corporation, Dale, Ind.**

**Filed Aug. 12, 1974, Ser. No. 496,639**
**Int. Cl.[2] A46B** *13/02*
**U.S. Cl. 15—23** **10 Claims**



**1.** Wiping apparatus for brushing and removing a portion of the wet stain or glaze on an article of furniture being finished comprising a housing, rotary brush means mounted on the housing, powered drive means for rotating said rotary brush means, a supply of absorbent web means mounted on the housing, guide means mounted on the housing for guiding fresh portions of said absorbent web means into contact with said rotary brush means so as to remove excess stain or glaze therefrom, and means for advancing fresh portions of said absorbent web means into contact with said rotary brush means.

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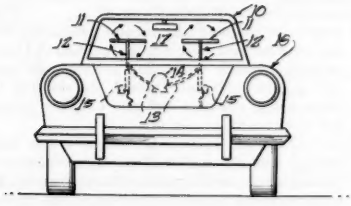
**3,919,734**

## ROTARY WINDSHIELD WIPER FOR VEHICLES

**John H. Mosley, Rte. No. 1, Franklin, Ill. 62638**

**Filed Jan. 15, 1975, Ser. No. 541,110**
**Int. Cl.[2] B60S** *1/44*
**U.S. Cl. 15—250.22** **1 Claim**



**1.** A windshield wiper for vehicles for cleaning the windshield surface of the vehicle comprising, in combination:

a wiper blade means;

wiper arm means being defined by an elongated channel forming member of U-shaped cross-sectional configuration having a flat back surface and a flat front surface with a slot extending completely therethrough and opening out of said front surface, a length of material defining a wiping member affixed in said slot and projecting forwardly outwardly therefrom and being of a non-cellular plastic foam material to engage and wipe the windshield surface, said wiper arm means further including a bracket affixed centrally at the back surface at the midpoint of said channel member and having a grooved opening centrally thereof, elongated support arm member having a top and a bottom end and an elongated base member having its top end affixed to said bottom end of the supporting arm with said base member extending downwardly therefrom and terminating in a bottom end, a series of longitudinally aligned and spaced-apart ratchet teeth formed along one side surface of said base member between said top and bottom ends thereof the top end portion of said support arm being formed in an eyelet and having a circular opening extending therethrough;

means rotatively affixing said wiper blade means to said wiper arm means for rotation relative thereto;

motor means;

means drivingly connecting said motor means to said wiper blade means to effect driving rotation thereof, the drive means being connected to the grooved opening in the central portion of the bracket and being mounted within the circular opening extending through the eyelet;

drive means connected to said wiper arm means for moving said arm means between an operative location positioning said wiper blade means on said windshield surface in the line of vision of the vehicle driver and passengers for cleaning the windshield, and an inoperative location positioning said wiper means out of the line of vision of said vehicle driver and passengers, the wiper arm positioning means including an electrically operated motor and a toothed drive gear drivingly connected to said motor means and having its teeth in meshing engagement with the ratchet teeth of the arm base member; and

heating means disposed in said wiper arm means for heating the same, the heating means including an elongated electrical resistance strip embedded in said wiping member material and extending therealong, one portion of said heating element being electrically connected to one end of said drive cable, the opposite end portion of said heating element being electrically connected to said channel member of said wiper arm and means electrically connecting said drive cable to a source of electrical energy for electrically energizing said heating element therefrom.

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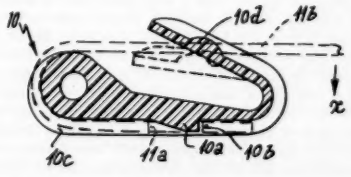
**3,919,735**

## MEANS FOR ENGAGEMENT BETWEEN THE ENDS

**Dario Arman, Via Venaria, 13/15, 10040 Druento (Turino), Italy**

**Filed July 8, 1974, Ser. No. 486,687**
**Claims priority, application Italy, July 20, 1973, 69176/73**
**Int. Cl.[2] B60S** *1/40*
**U.S. Cl. 15—250.32** **3 Claims**



**1.** In a releasable articulated coupling for interconnecting a windshield wiper blade to an oscillating arm of a motor vehicle, wherein the windshield wiper blade has a back mounting including a pair of parallel spaced apart back mounting members and the oscillating arm has a U-shaped end with a recess

in its free end, and a coupling member is provided interconnecting the blade and the oscillating arm; the improvement wherein said coupling member comprises a resilient molded plastic hook-shaped member having a base pivotally mounted between said back mounting members, a back portion extending from said base, a front portion extending from the end of said back portion away from said base, a projection on the side of said back portion away from said front portion, and parallel side ribs forming a channel around said coupling member for receiving said U-shaped end of said arm, whereby said oscillating arm may be snapped onto said coupling member with the U-shaped end thereof extending over the base of said member and the projection of said member engaging said recess in said oscillating arm.

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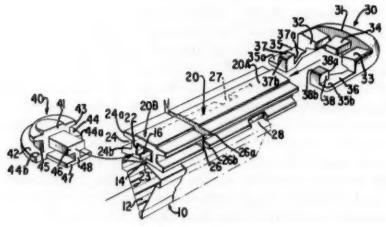
**3,919,736**

**WINDSHIELD WIPER BLADE UNIT**

**Joseph R. Bourassa, Huntington, and Manuel Lopez, Trumbull, both of Conn., assignors to Parker Hannifin Corporation, Shelton, Conn.**

**Filed Sept. 13, 1974, Ser. No. 505,735**
**Int. Cl.[2] B60S 1/02**
**U.S. Cl. 15—250.42** **16 Claims**



**8.** A closure element to be fixed to and across an end of a windshield wiper blade backing strip having at said end a central longitudinal hollow formed with a slot along the bottom thereof, for slidably receiving head and neck portions of an elastic wiper blade, and having laterally open side channels at the opposite sides of the strip for slidably receiving the ends of the claws of a pressure-applying wiper blade holder, said element comprising a body portion having thereon integral protrusions to fit into the ends of said hollow and said slot, said body portion defining an outwardly open arcuate channel the ends of which mate with ends of said strip channels to provide a trackway for guiding said strip onto said claw ends.

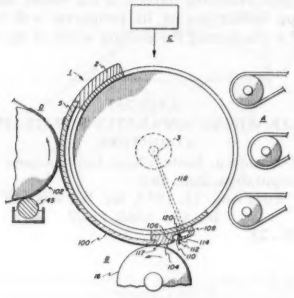
**10.** A resilient clip to hold a windshield wiper blade unit assembled detachably on the claws of a pressure-applying wiper blade holder, comprising a unitary piece of a stiff resilient material formed with a base portion to lie across an end of a backing strip of said unit, finger portions respectively protruding from said base portion at its opposite sides so as to fit into end portions of laterally open channels formed along the opposite side of said backing strip for slidably receiving ends of said claws, and at least one resilient leg each spaced below one of said finger portions and extending forwardly from said base portion and having on its end an upstanding lug spaced ahead of said finger portion and formed to extend upwardly into one of said channels through an opening provided in the bottom wall of said channel for securing said clip on said strip end and to hold a claw of said holder in the channel space between said lug and said finger portion, said lug being depressible from said channel against the resiliency of said clip to admit said claw into or to release it from said space.

**3,919,737**

**CLEANING APPARATUS**

**Bernard James Riley, Jr., Ontario, N.Y., assignor to Xerox Corporation, Stamford, Conn.**

**Division of Ser. No. 876,922, Nov. 14, 1969, Pat. No. 3,686,035. This application Apr. 28, 1972, Ser. No. 248,766**
**Int. Cl.[2] A47L 5/38**
**U.S. Cl. 15—308** **3 Claims**



**1.** Apparatus for removing accumulated material from a nip formed between two cylindrical members comprising;

a. a first cylindrical member;

b. a second cylindrical member positioned in contact with said first cylindrical member with its axis parallel to the axis of said first cylindrical member to thereby define a nip between said members;

c. a slot formed in the surface of said second cylindrical member extending substantially across said second cylindrical member surface; a chamber within said second cylindrical member and communicating with said slot;

d. means for rotating said first and second cylindrical members relative to each other in rolling contact through said nip in a direction to constrain within said nip accumulated material on at least one of said members;

e. bendable resilient wiper means coupled to an edge of said slot and extending radially with respect to said second cylindrical member, said second cylindrical member having a surface portion adjacent said wiper means lower relative to the first cylindrical member surface than the opposite edge of said slot thereby permitting said wiper means to bend and be pressed against the surface of the cylindrical members at the nip whenever the advancing cylindrical members pass over said wiper means in interface contact, a seal thereby being formed between said cylindrical members between a curved lip portion of said slot and said first cylindrical member on one side of the slot, and the first cylindrical member and the bent resilient wiper means at the other side of said slot;

f. vacuum producing means; and

g. means for coupling said vacuum producing means with said chamber and therethrough into said slot said vacuum producing means vacuuming accumulated materials at said nip into said slot, through the slot and therefrom through said chamber and said coupling means as said slot moves through said nip,

after said slot and said resilient wiper means have passed through said nip, said resilient wiper means providing a flicking action to flick accumulated material, if any, remaining at the nip exit by virtue of the resilient wiper means springing back to an unbent radial position from said first cylindrical member surface.

**2.** Apparatus according to claim 1 further comprising metering means in said chamber for creating a uniform negative pressure along the length of said slot and wherein said metering means is provided with openings of progressively increasing widths across its length and wherein said coupling means

is coupled to said chamber at the end of the chamber where the openings are smallest.

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**3,919,738**

## PUSH-ON HANDLE

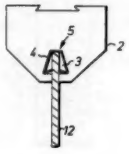
**Karl-Heinz Schmall, Baden-Baden, Germany, assignor to Precitec Gesellschaft fur Prazisionstechnik und Elektronik, Baden-Baden, Germany**

**Filed May 28, 1974, Ser. No. 474,027**

**Claims priority, application Germany, June 9, 1973, 2329669**

**Int. Cl.[2] A47J** *45/00*

**U.S. Cl. 16—110 R** **12 Claims**




**1.** A push-on handle for a circuit board to be carried by the handle, said handle comprising an elongated member formed longitudinally on one side thereof with a slot to receive said circuit boards, and a retaining element secured to said member so as to be immovable as a whole relative to said member and having a sharp-edged projection formed and located to permit insertion of said board into said slot and to dig resiliently into the surface of said circuit board when mounted in said slot, so as to resist the withdrawal of the circuit board from said slot and permanently affix said handle to said board.

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**3,919,739**

## METHOD AND APPARATUS FOR AUTOMATIC PRODUCTION OF STUFFED MEAT

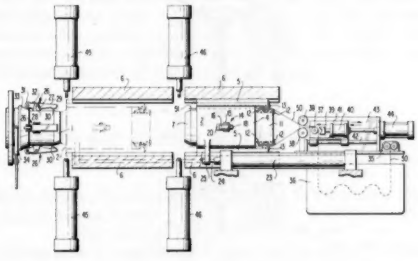
**Kelichi Kawai, Amagaski, Japan, assignor to Futaba Denki Kogyo Kabushiki Kaisha, Japan**

**Filed Mar. 8, 1974, Ser. No. 449,450**

**Claims priority, application Japan, Mar. 10, 1973, 48-28331**

**Int. Cl.[2] A22C** *11/00*

**U.S. Cl. 17—33** **27 Claims**



**1.** An arrangement for the automatic production of stuffed meats in a continuous band casing comprising:

a meat extruder having a filling nozzle means;

a casing supply means;

carrier means for carrying at least a portion of the continuous band casing from said supply means to said filling nozzle means;

means for selectively advancing said carrier means toward said filling nozzle means; and

means provided on said carrier means for spreading an open end of the continuous band casing on said filling nozzle means when said carrier means is disposed adjacent said filling nozzle means, said spreading means including a head member displaceably mounted in said carrier means, said head member having an extended position extending beyond the end of said carrier means and a retracted position in said carrier means, means for normally biasing said head member into said extended position, said head member being displaced into said retracted position by engagement with said filling nozzle means as said carrier means is advanced toward said filling nozzle means.

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**3,919,740**

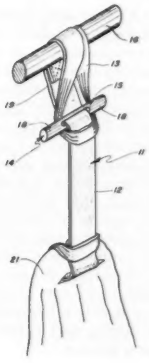
## FLEXIBLE STRAP HANGER

**Erhard Edwin Scherb, Allendale, N.J., assignor to Allied Chemical Corporation, Petersburg, Va.**

**Filed Jan. 25, 1974, Ser. No. 436,421**

**Int. Cl.[2] A22B** *1/00*

**U.S. Cl. 17—44** **7 Claims**




**1.** A strap hanger for hanging fresh meats such as sides of beef comprising a flat webbing woven from polyester yarn,

said webbing having a thickness from 1/32 to 3/16 inch and a width ranging from ½ to 2 inches and being folded over on itself and stitched or mechanically fastened at both ends to form substantially identical loops at each of said ends, said loops having a length between 3 and 10 inches;

a sliding bar in the form of an elongated rod of a length at least three times the width of said webbing but not exceeding four times the width of said web and a diameter ranging from ⅜ to 1 inch;

said sliding bar having a slot extending along the axis thereof; said slot having a length exceeding the webbing width by 1/32 to ⅛ inch and a height approximately equal to the webbing thickness;

said webbing extending through said slot whereby said sliding bar is constrained from sliding off either end of said strap;

whereby one end of said strap can be forced through a piece of meat, the second end is fed through the loop in said one end, draped over an overhead beam, looped around both ends of said sliding bar and secured to said overhead beam by sliding said bar upwardly along said webbing.

## 3,919,741
## APPARATUS FOR BEHEADING FLATFISH

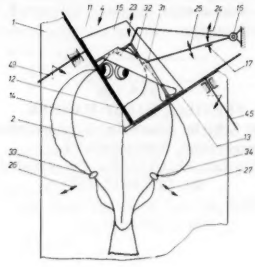
**Horst Backhaus, and Heinz Schröder, both of Lubeck, Germany, assignors to Nordischer Maschinebau Rud. Baader, Lubeck, Germany**

**Filed Sept. 6, 1974, Ser. No. 503,715**

**Claims priority, application Germany, Oct. 3, 1973, 2349660**

**Int. Cl.[2] A22C** *25/14*

**U.S. Cl. 17—63** **5 Claims**



**1.** An apparatus for beheading flatfish comprising a horizontal support plate having a V-shaped cutaway portion bordered by two rectilinear edges serving as cutting edges, a pair of cutting knives shearing with said cutting edges, a pair of rotatably-mounted shafts mounting said cutting knives at the free ends of said respective shafts, and adjusting means for holding a flatfish centered on said support plate with its head portion in selected position relative to said cutting edges, said pair of shafts being rotatably mounted parallel to the plane of said support plate and being disposed with their axes substantially perpendicular to each other, each of said shafts being rotatable in a direction opposite to each other, said cutting knives having a pair of opposed wings, each of said wings having a cutting edge, said cutting knives being rotated by said shafts in a synchronized movement in which the cutting edge of one cutting knife passes along one cutting edge of the cutaway portion in a shearing action immediately before the cutting edge of the other cutting edge passes along the other cutting edge of the cutaway portion.

## 3,919,742
## COTTON SEED DELINTING MACHINE

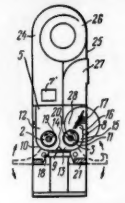
**Ubai Arifovich Arifov, Observatorskaya ulitsa, 85; Dmitry Efimovich Kharmats, Bolskaya Mirabadskaya ulitsa, 119; Gafur Abdushukurovich Abdurashidov, TS-13, 21, kv. 29; Gennady Andreevich Leontiev, Armavirskaya ulitsa, 1; Jury Vladimirovich Zhegallo, massiv Vysokovoltny, 122, kv. 21; Eduard Simkhovich Parilis, proezd Morozova, 1/9, kv. 21; Alexandr Vasilievich Vzenkonsky, TS-2, 6, kv. 16; Anatoly Dmitrievich Sapon, TS-2, 15, kv. 25; Vladimir Fedorovich Lavnikanis, ulitsa lenina, 16; Mark Iosifovich Kogan, ulitsa Botkina, 1, kv. 14; Nikolai Petrovich Egorov, ulitsa 7 topolei, 4, and Abuzar Gabdurakhmanovich Shaidullin, kvartal, 6, 26 kv. 13, all of Tashkent, U.S.S.R.**

**Continuation of Ser. No. 259,833, June 5, 1972, abandoned. This application Oct. 9, 1973, Ser. No. 404,734**

**Int. Cl.[2] D01B** *1/02*

**U.S. Cl. 19—41** **8 Claims**

**1.** A cotton seed delinting machine comprising: a frame having cylinders which are mounted on said frame one opposite from the other and which are capable of unidirectional rotation, said cylinders bearing on their surface lint-removing elements capable of acting upon seed to remove lint therefrom during rotation of said cylinders; a means for feeding seeds to said cylinders, said means being mounted on the side of said frame; a means for imparting rotation to said cylinders; a housing enclosing said cylinders, said housing consisting of three sections; including a lower section, a left-hand section and a right-hand section, one of said cylinders being mounted on the left-hand section of the housing and forming together therewith a separate seed chamber along the entire length of the cylinder, said chamber being wedge-shaped in the cross section and narrowing in the direction of flow of seeds conveyed by said rotating cylinders; said cylinders and the lower section of said housing forming together a second seed chamber which is adjacent to said first chamber; the second of said cylinders being mounted in the right-hand section of said housing and forming together therewith a third seed chamber along the entire length of the cylinder, said third chamber



being adjacent to the second chamber and incorporating in its top portion a widening shape in the form of a longitudinal duct of a semi-circular section to create a dense layer of seeds; said duct having an open upper outlet for the lint and seeds being delinted; said right-hand side section of the housing of said third seed chamber incorporating at the bottom an integral cylindrical surface coaxial to the surface of the second cylinder and having a clearance between said surfaces set within the limits of from **11** to **15** mm; a chamber for a complete separation of lint from seeds located above said cylinders for recieving the lint and seeds being delinted; and a trough for discharging delinted seeds located on said frame on the side opposite to a seed feeding means.

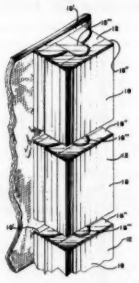
## 3,919,743
## MAGNETIC FASTENER

**Alvin H. Cutler, Box 71, Midvale, Idaho 83645**

**Filed Nov. 5, 1973, Ser. No. 413,075**

**Int. Cl.[2] A44B** *17/00*

**U.S. Cl. 24—201 B** **1 Claim**



**1.** A magnetic fastener for a garment comprising:

a plurality of elongated bar-like male fastening members having faces fastened to a surface of a flap of said garment along a common longitudinal axis, the opposite face of each of said members being convexly curved in a transverse direction and being elongated along said longitudinal axis; and

a plurality of elongated bar-like female fastening members having faces fastened to a surface of an overlapping complementary mating flap of said garment along a common longitudinal axis and each having the opposite face con-

cavely curved in a transverse direction and being elongated along said longitudinal axis, one of said fastening members being magnetized and the opposite member being fabricated of a magnetically attractable material, said magnetized fastening member being provided with an armature projecting out of its respective face, and said opposite member having a groove to receive said armature, the curved faces adapted to contact each other in fastened position.

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## 3,919,744
## CONCEALED SLIDE FASTENER

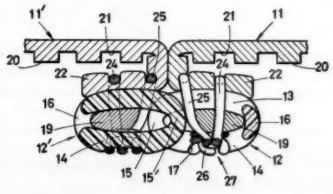
**Akiyoshi Kandou, Uozu, Japan, assignor to Yoshida Kogyo Kabushiki Kaisha, Tokoyo, Japan**

**Filed Feb. 24, 1975, Ser. No. 552,232**

**Claims priority, application Japan, Mar. 7, 1974, 49-26672[U]**

**Int. Cl.² A44F** *19/12, 19/34*

**U.S. Cl. 24—205.1 C** **2 Claims**



**1.** A concealed slide fastener comprising a pair of opposed stringer tapes each having a longitudinal element-carrying edge inwardly folded on itself; rows of fastener elements secured to respective element-carrying edges, each of said fastener elements having an upper leg portion, a lower leg portion and a coupling head merging into these leg portions, said lower leg portion being provided with a recess for accommodating sewing threads; a filler cord inserted longitudinally in a space defined between said upper and lower leg portions of the fastener elements, and a first and a second sewing thread for securing the row of fastener elements to said element-carrying edge, said first sewing thread passing substantially vertically towards said recess through said filler cord and securing the latter together with the elements to said element-carrying edge, said second sewing thread extending from said recess obliquely at an angle to the vertical axis of the fastener stringer and located immediately adjacent the fold of the respective stringer tape and urging said filler cord away from the coupling region of the fastener elements.

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## 3,919,745
## SYSTEM FOR ASSEMBLING TWO PARTS AND A SLIDING FASTENER SLIDER INCLUDING APPLICATION THEREOF

**Michel Dupon, Airaines, France, assignor to Fermeture Ailee S.A., Airaines, France**

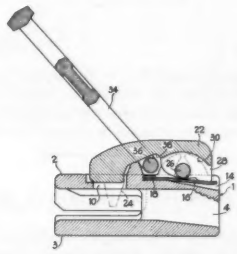
**Filed Sept. 3, 1974, Ser. No. 502,497**

**Claims priority, application France, Sept. 5, 1973, 73.31964**

**Int. Cl.² A44B** *19/30;* **F16B** *1/00*

**U.S. Cl. 24—205.14 R** **8 Claims**

**1.** A sliding fastener slider comprising a body, a locking member carrying a locking pawl adjacent a first end of the locking member for locking the slider in position on the fastener, two pairs of teeth which extend from an upper part of the body, the teeth of each pair facing each other and being spaced a short distance apart in a given direction, the pairs of teeth being spaced apart transversely of said given direction, a spring strip which extends between the pairs of teeth substantially in said given direction, means on said body for holding a first end of said strip, an end portion of said strip opposed to said first end being free, said free end portion of the strip being cooperative with an end portion of the locking member opposed to said first end of the locking member for biasing the locking member in a direction to put the pawl in an operative locking position, the locking member carrying a flange extending substantially in said given direction between the pairs of teeth, the locking member defining two surfaces which are substantially in the form of a portion of a cylinder and are separated by the flange and engage the teeth of the corresponding pairs of teeth, a pin which fits between the two teeth of each pair and extends from each side of the flange, said teeth of each pair being bent around the pin and extending between the pin and the corresponding substantially cylindrical surface.



**5.** A system for assembling two parts, said system comprising, on a first of said parts which is composed of easily deformable material, two projecting teeth spaced a short distance apart in a given direction and disposed in facing relation and, on a second of said parts, a flange which extends in a general direction parallel to said given direction, a tenon engageable between the two teeth and carried by the flange, means defining a surface which is substantially in the shape of a portion of a cylinder and extends laterally from the flange above the tenon and the teeth, said surface having such curvature that, under the effect of a pressure exerted in a direction to relatively move said two parts toward each other and cause the teeth to be urged against said surface, said surface is capable of bending the two teeth toward each other over and above the tenon.

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## 3,919,746
## AUTOMATICALLY LOCKING SLIDER FOR SLIDE FASTENERS

**Takeo Fukuroi, Uozu, Japan, assignor to Yoshida Kogyo Kabushiki Kaisha, Tokyo, Japan**

**Filed Jan. 30, 1975, Ser. No. 545,360**

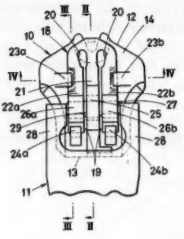
**Claims priority, application Japan, Feb. 7, 1974, 49-15866[U]**

**Int. Cl.² A44B** *19/30*

**U.S. Cl. 24—205.14 R** **4 Claims**

**1.** In a slide fastener slider of the type having a pull tab and a body and a locking means, said slider body including a top wing and a bottom wing which are interconnected by a web located centrally at the front end of said slider body so as to define a generally Y-shaped guide channel therethrough, an automatic lock mechanism comprising, in combination, a locking leaf spring generally arranged longitudinally over said top wing of said slider body, said locking leaf spring having a pair of parallel spaced slits extending lengthwise from its rear end and terminating short of its front end whereby said locking leaf spring is divided into a central strip and a pair of side strips which are interconnected at the front end of said locking leaf spring, and spring retaining means on said top wing of said slider body adapted to engage said side strips of said locking leaf spring to retain the latter on said slider body, said central strip of said locking leaf spring having a portion extending rearwardly of said side strips to provide a locking pawl which

normally projects into said guide channel in said slider body, said central strip of said locking leaf spring also having a raised portion intermediate both ends thereof which is adapted to be



surrounded by said pull tab in such a manner that when a pull is exerted on said pull tab, said central strip is generally raised away from said slider body whereby said locking pawl retracts away from said guide channel in said slider body.

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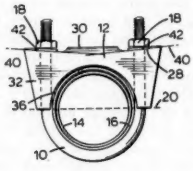
**3,919,747**

## SADDLE CLAMPS AND A METHOD OF MAKING SUCH CLAMPS

**Hermann Friedrich Offterdinger, Burlington, Canada, assignor to The Schultz Manufacturing Company Limited, Burlington, Canada**

**Filed Jan. 28, 1975, Ser. No. 544,735**
**Int. Cl.[2] B65D** *63/00*; **F16L** *41/00*
**U.S. Cl. 24—277** **5 Claims**



1. A saddle clamp for clamping about the periphery of a cylindrical member comprising a saddle strap and a cooperating U-bolt each having a semicircular bight portion embracing a respective semicircular part of the cylindrical member periphery, which parts meet one another at a diametric plane, the U-bolt having two substantially parallel tangential leg portions each at one end of its bight portion and externally screw-threaded at their ends for the reception of respective clamping nuts, the saddle strap having two apertures for the passage of the bolt legs therethrough and nut-bearing surfaces surrounding said apertures, the said surfaces being disposed in respective planes which are sufficiently spaced from the diametric plane not to intersect the cross-section of the cylindrical member and are symmetrically downwardly inwardly inclined with respect to the diametric plane.

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**3,919,748**

## APPARATUS FOR ALTERING THE LENGTH OF SYNTHETIC STRANDS

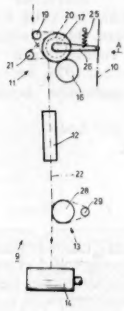
**Erich Bucher, Goppingen, Germany, assignor to Zinser-Textilmaschinen GmbH, Ebersbach, Germany**

**Filed Mar. 5, 1973, Ser. No. 338,300**
**Claims priority, application Germany, Mar. 3, 1972, 2210272**
**Int. Cl.[2] D02J** *1/22*
**U.S. Cl. 28—71.3** **7 Claims**

1. Apparatus for altering the length of a synthetic strand comprising, in combination:

a first strand feeding means including a driven, unheated roll means (**17** or **17'** or **17''**) around which the strand is to be first wound;

a first heating means including a heated roll means (**20** or **20'**) rigidly connected to said unheated roll means and having a diameter different from that of said unheated roll means and around which the strand is to be wound immediately after passing from said first strand feeding means, said first heating means being laterally adjacent to and coaxial with said driven roll means and rigidly connected thereto so as to be driven at exactly the same r.p.m. as said driven roll means;



a second heating means (**12**), over which the strand is to pass subsequent to its passage from said first heating means, said second heating means being spaced a substantial distance from said first heating means;

a second strand feeding means including a driven roller (**28**) around which said strand is to be wound;

said first and second strand feeding means being continuously driven at different peripheral speeds to effect alteration in the length of said strand.

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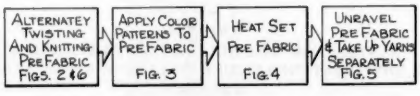
**3,919,749**

## METHOD FOR PRODUCING SPACE-DYED TEXTURED YARN

**Joe R. McWhirter, McAdenville, N.C., and Donald O. Shepherd, Clover, S.C., assignors to Pharr Yarns, Incorporated, McAdenville, N.C.**

**Division of Ser. No. 349,426, April 9, 1973, Pat. No. 3,861,176. This application Oct. 15, 1974, Ser. No. 514,652**
**Int. Cl.[2] D04B** *19/00*
**U.S. Cl. 28—72.16** **2 Claims**




1. A method of producing space-dyed yarns comprising the steps of:

a. forming a prefabric by weft knitting a pair of yarns in plated relationship in each stitch loop of successive courses and while continuously twisting the yarn together in one direction during the knitting of alternate courses and continuously twisting the yarns together in the opposite direction during the knitting of intervening courses so that the yarns periodically change positions in a regular manner in the knit prefabric,

b. applying color to selected areas of the prefabric,

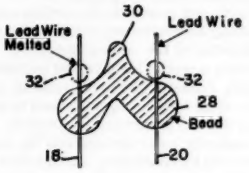
c. heat-setting the prefabric, and

d. unravelling the knit fabric while separately taking up each yarn of the pair to produce space-dyed yarns of uniform quality.

## 3,919,750
## METHOD OF MAKING PHOTOFLASH LAMP IGNITION MOUNT STRUCTURE WITH SHAPED BEAD

John P. Saunders, Beverly, and Burleigh H. Leach, Hamilton, both of Mass., assignors to GTE Sylvania Incorporated, Danvers, Mass.

Division of Ser. No. 444,343, Feb. 21, 1974, Pat. No. 3,897,196. This application Nov. 18, 1974, Ser. No. 524,605
Int. Cl.[2] H01J 9/18
U.S. Cl. 29—25.15 5 Claims




1. The method of making an ignition mount structure for a photoflash lamp, said method comprising:

providing a pair of lead-in wires closed at one end in the form of a hairpin;

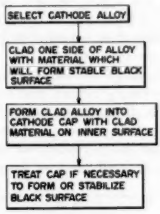
placing a bead of meltable insulating material between said lead-in wires and fusing said bead to said wires to retain a spacing between said pair of wires;

and while said bead is still in a plastic state from said fusing step, stretching the midportion of said bead between said pair of lead-in wires to protrude toward the closed end thereof to provide a raised barrier between locations where the lead-in wires pass through the bead for preventing post-ignition short circuits between said wires.

## 3,919,751
## METHOD OF MAKING FAST WARM UP PICTURE TUBE CATHODE CAP HAVING HIGH HEAT EMISSIVITY SURFACE ON THE INTERIOR THEREOF

William E. Buescher, and Donald R. Kerstetter, both of Emporium, Pa., assignors to GTE Sylvania Incorporated, Stamford, Conn.

Division of Ser. No. 440,685, Feb. 8, 1974. This application Aug. 5, 1974, Ser. No. 494,640
Int. Cl.[2] H01J 9/00
U.S. Cl. 29—25.18 1 Claim

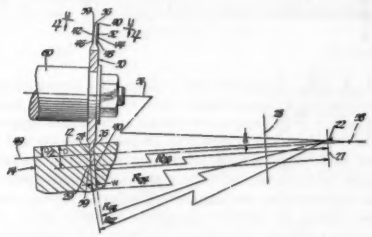

SELECT CATHODE ALLOY
CLAD ONE SIDE OF ALLOY WITH MATERIAL WHICH WILL FORM STABLE BLACK SURFACE
FORM CLAD ALLOY INTO CATHODE CAP WITH CLAD MATERIAL ON INNER SURFACE
TREAT CAP IF NECESSARY TO FORM OR STABILIZE BLACK SURFACE

1. In the method of making a top cap for a fast warm-up cathode, the steps comprising: cladding a first material selected from the group consisting of nickel and cathode nickel alloys with a second material comprised essentially of about 20% chromium with the remainder essentially nickel; forming said clad material into a substantially cup-shaped top cap with said second material on the interior thereof; and firing said top cap in a wet dissociated ammonia atmosphere for at least 10 minutes at about 900°C to 1300°C to oxidize said chromium.

## 3,919,752
## MILLING CUTTER

Harold W. Ferchland, Troy, Mich., assignor to General Motors Corporation, Detroit, Mich.

Division of Ser. No. 374,112, June 27, 1973, Pat. No. 3,839,942, which is a continuation-in-part of Ser. No. 216,212, Jan. 7, 1972, abandoned. This application May 20, 1974, Ser. No. 471,222
Int. Cl.[2] B26D 1/12
U.S. Cl. 29—103 R 2 Claims

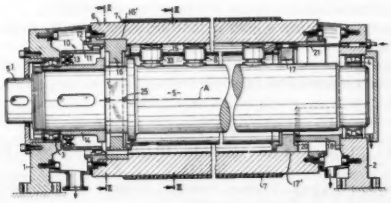


1. A milling cutter for milling a curved groove having two parallel opposed sides with different radii of curvature relative to a common centerline, said cutter having a body with oppositely facing sides and an axis of rotation and radially projecting, circumferentially-spaced teeth, said teeth having peripheral cutting edges with axially spaced ends that lie on a conical surface whose vertex is intersected by said axis on one side of said cutter body, said ends of said peripheral cutting edges spaced from said vertex at different radii, said teeth further having parallel sides that are straight and intersect said ends of said peripheral cutting edges, said teeth sides having radially extending edges that intersect said ends of said peripheral cutting edges, and only said side of said teeth closest to said vertex on said one side of said cutter body having relieved flanks that trail the radially extending edges on this side when said cutter is rotated in a cutting direction.

## 3,919,753
## ROLL

Rolf Lehmann, Mutschellen Aargau, and Helmuth Lehmann, Zurich, both of Switzerland, assignors to Escher Wyss Limited, Zurich, Switzerland

Filed Nov. 5, 1974, Ser. No. 520,979
Claims priority, application Switzerland, Nov. 22, 1973, 16495/73
Int. Cl.[2] B21B 31/32
U.S. Cl. 29—113 AD 8 Claims

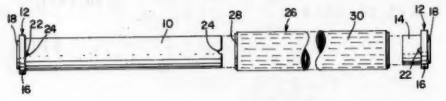


1. A roll comprising a shaft, bearings supporting the shaft for rotation, a roll shell surrounding the shaft with clearance, means coupling the shell to the shaft for rotation therewith, carrier means disposed in said clearance and coupled to one of said bearings for restraint against rotation, and hydraulically operated means disposed in said carrier means to exert a stress between said shaft and shell.

## 3,919,754
## SEAMLESS DAMPENING ROLLER AND MEANS TO SUPPORT SAME

Anthony A. Sorresso, 444 Walker St., North Babylon, N.Y. 11703

Filed Jan. 21, 1975, Ser. No. 542,732
Int. Cl.[2] B21B 27/02
U.S. Cl. 29—120 6 Claims

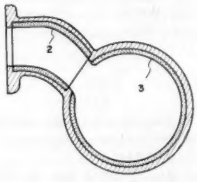



1. A roller device for the transfer of a liquid including in combination a support tube, a pair of end caps for detachable imposition in the respective lateral ends of said support tube, a dampening roller adapted to absorb the liquid and slidable over said support tube and being supported thereby, and means on each of said caps with which to rotatably journal said support tube, said dampening roller including a rigid core tube having an internal periphery complimentary with the external periphery of said support tube, and moisture-absorbent means on the external periphery of said core tube to absorb the liquid.

## 3,919,755
## METHOD OF MAKING A HIGH-STRENGTH HEAT-INSULATING CASTING

Yasuhisa Kaneko; Yasuhiko Komatsu; Yasuo Okada, and Ryuichi Masuda, all of Toyota, Japan, assignors to Toyota Jidosha Kogyo Kabushiki Kaisha, Toyota, Japan

Filed Oct. 31, 1973, Ser. No. 411,459
Claims priority, application Japan, Mar. 6, 1973, 48-26386
Int. Cl.[2] B22D 11/12
U.S. Cl. 29—156.4 WL 5 Claims




1. Method of manufacturing a high-strength, heat-insulating casting which comprises the steps of

molding a flexible porous ceramic liner from a mixture of a refractory material and alumina cement, which mixture is substantially free from any heat-resistant binder,

casting an article which is to carry said liner by forming molten metal against said liner, and

impregnating said liner with a heat resistant binder after completion of said casting step.

## 3,919,756
## BALL PLUG VALVE AND METHOD OF MAKING THE SAME

Bengt Ake Kajrup, Malmo, Sweden, assignor to Saab Scania Aktiebolag, Linkoping, Sweden

Division of Ser. No. 280,475, Aug. 14, 1972, Pat. No. 3,819,150. This application Apr. 15, 1974, Ser. No. 461,152
Int. Cl.[2] B23P 15/00, 11/00
U.S. Cl. 29—157.1 R 4 Claims

1. The method of making a valve that comprises a one-piece body in which there are coaxial passage portions opening outwardly to opposite ends of the body from a medial chamber, and a valve element of substantially hard material rotatable in said chamber about an axis transverse to said passage portions to and from a position in which a passage through the valve element is aligned with said passage portions, the external diameter of said valve element being substantially larger than the diameter of said passage portions so that the passage in the valve element has a diameter suitable for ducting connectable with end portions of the valve body, said method being characterized by:

A. forming a one-piece, seamless tubular body blank

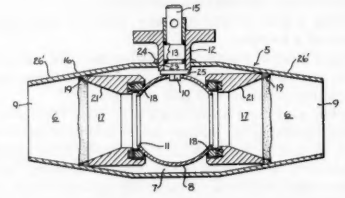
1. of a metal that is plastically deformable in cold condition,

2. having substantially uniform wall thickness along its length and around its circumference, and

3. having an inside diameter at least as large as the outside diameter of the valve element;,

B. forming a pair of annular seat members, each having an outside diameter to be receivable in said blank and each cooperable with the valve element to sealingly engage the same without preventing its rotation;

C. inserting the valve element into the medial portion of the blank and by establishing a connection between the blank and the valve element that constrains the valve element to rotation, confining the valve element against axial motion relative to the blank;




D. establishing the seat members in the blank at opposite sides of the valve element and spaced from one another by the valve element;

E. by cold working of the blank, drawing down portions thereof at axially opposite sides of its medial portion to taper said drawn-down portions towards the ends of the blank and decrease their inside diameters near the ends of the blank to less than the outside diameter of the valve element, the drawing down of at least one of said portions being effected after the seat members are established in the blank;

F. temporarily imposing upon the seat members an axially convergent force by which they are held in sealing engagement with the valve element and coaxial with one another, the axial positions of the seat members relative to the blank being thus established by their engagement with the valve element; and

G. after said portions of the blank have been drawn down to at least a substantial extent, and while maintaining said force upon the seat members, establishing a fixed, permanent connection between each of the seat members and the blank around the periphery of the seat member and at a zone thereof axially spaced from the valve element.

## 3,919,757
## METHOD OF FABRICATING A VENT STRUCTURE CONTAINING SEPARATING PARTICLES

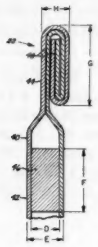
Joseph C. McGuire, Kennewick, Wash., assignor to McDonnell Douglas Corporation, Long Beach, Calif.

Division of Ser. No. 296,680, Oct. 11, 1972, Pat. No. 3,876,403. This application May 28, 1974, Ser. No. 473,448
Int. Cl. B23p 15/16
U.S. Cl. 29—163.5 F 7 Claims

1. A method of fabricating a vent structure, which comprises the steps of:

uniformly filling a ductile and relatively thin-walled tubing of predetermined length and size with fine separating particles;

then flattening a normally upper portion of said tubing at a predetermined flattening pressure;



coiling said flattened tubing portion against itself; and

pressing said coiled tubing portion at a predetermined pressing pressure.

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**3,919,758**

## CRIMPING MEANS FOR PRESSURE CONNECTING AN AT LEAST PARTIALLY WIRE SHAPED PART AND A TERMINAL PART

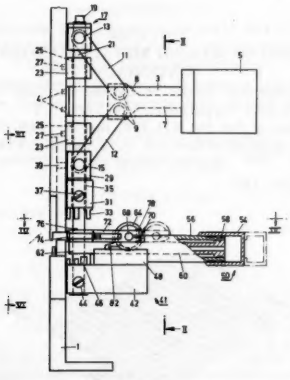
**Jiri Stepan, Stafa, Switzerland, assignor to K. Loepfe Automation AG, Hombrechtikon, Switzerland**

**Filed Apr. 11, 1974, Ser. No. 460,123**

**Claims priority, application Switzerland, Apr. 17, 1973, 5486/73**

**Int. Cl.² H01R** *43/04*

**U.S. Cl. 29—203 DT** **34 Claims**



**1.** Crimping means for crimping of a cable wire to a terminal part, comprising:

first feed means for receiving the cable wire and positioning it at a first location; second feed means for feeding the terminal part to a position near the wire at said first location;

first and second crimping members both movable relative to one another and both movable relative to other unmoved parts of said crimping means and both movable toward and away from each other and both movable toward and away from said first location to press the wire and terminal part together; moving means for so moving said crimping members relative to each other;

ejector means movable to engage the crimped together wire and terminal part and to eject same from said crimping means and said first location; means for so moving said ejector means after said crimping members have moved apart.

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**3,919,759**

## DRILL DRIFTING DEVICE

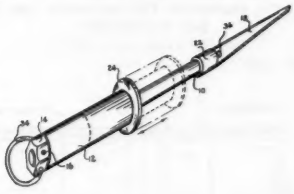
**Robert E. Marleau, 8945 Eric Ave., Apt. 5, Montreal 432, Quebec, Canada**

**Filed Aug. 27, 1973, Ser. No. 391,813**

**Claims priority, application Canada, Dec. 19, 1972, 159452**

**Int. Cl.² B25B** *27/02*

**U.S. Cl. 29—254** **2 Claims**



**1.** A drill drifting device adapted to drift a taper shank drill or the like outside its socket comprising;

a rod member,

a wedge-shaped element axially secured at one end of the said member and adapted to be introduced through the said socket,

a heavy sleeve adapted to freely slide over substantially the full length of the said rod member,

a stopping member secured to said rod member at each end thereof for stopping the movement of said sleeve,

means for releasably retaining the sleeve to the end of said rod member remote from said wedge-shaped element, the said means comprising a compressible spring member radially mounted between the said rod member and the said sleeve for blocking the sliding motion of the sleeve relative to the rod member, whereby the sliding movement of the sleeve on the rod member produces a retraction of the spring member in the rod member or the sleeve.

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**3,919,760**

## APPARATUS AND METHOD FOR APPLYING STRIP SOLDER MATERIAL

**George W. Roders, Kenosha, Wis., assignor to Modine Manufacturing Company, Racine, Wis.**

**Filed Sept. 30, 1974, Ser. No. 510,487**

**Int. Cl.² B23P** *17/00, 19/00*

**U.S. Cl. 29—417** **15 Claims**

**1.** Apparatus for feeding, cutting and substantially simultaneously applying strip solder material to an assembly comprising a plurality of workpieces preliminary to soldering the workpieces to another member, comprising: retaining means for retaining said workpieces in predetermined positions relative to each other; feeding means for feeding said strip solder material into simultaneous contact with adjacent corresponding surfaces of said workpieces; cutting means for cutting said strip material to provide a cut strip of predetermined length sufficient for said simultaneous contact; and shaping means for bending the said cut strip at the ends thereof into wrap-around gripping engagement with the sides of said assembly of workpieces.

**12.** The method of forming, cutting and substantially simultaneously applying strip solder material to an assembly comprising a plurality of workpieces preliminary to soldering the workpieces to another member, comprising: retaining the

workpieces in predetermined positions relative to each other; feeding a strip of solder material into simultaneous contact with adjacent corresponding surfaces of said workpieces; cutting said strip material to provide a cut strip having a predetermined length sufficient for said simultaneous contact with the ends of said cut strip projecting beyond the sides of said assembly; and bending the projecting ends of said cut strip into wrap-around gripping engagement with said sides of said assembly.

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3,919,761

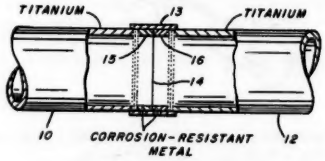
**METHOD OF HANDLING CORROSIVE SUBSTANCES**

**Howard B. Bomberger, Jr., Canfield, Ohio, assignor to RMI Company, Niles, Ohio**

**Division of Ser. No. 302,467, Oct. 31, 1972, Pat. No. 3,876,136, which is a continuation-in-part of Ser. No. 152,771, June 14, 1971, abandoned. This application Apr. 22, 1974, Ser. No. 462,848**

**Int. Cl.² F16L** *13/02, 58/00*

**U.S. Cl. 29—428** **6 Claims**




1. A method of handling a substance in a titanium article formed of more than one piece, which substance corrodes titanium at restricted crevices but to which titanium is otherwise corrosion-resistant, said method comprising:

welding inserts to the ends of each titanium piece where the piece is to confront another piece in the article and form a restricted crevice;

said inserts being of a metal which is compatible with titanium but is more resistant to corrosion than titanium and which avoids formation of a galvanic couple with titanium in the presence of said substance;

assembling said pieces to form said article with said inserts abutting and with restricted crevices confined to said inserts;

introducing said substance to said article; and

developing a high-ohmic-resistance film on the titanium by polarization.

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3,919,762

**PROCESS FOR THE MANUFACTURE OF PARALLEL WIRE STRANDS FOR BRIDGES AND THE LIKE BY WINDING AND UNWINDING**

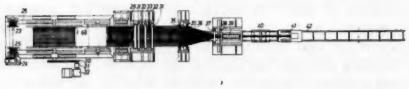
**Wolfgang Borelly, Schwanenstr. 2 C, 68 Mannheim 51, Germany**

**Continuation-in-part of Ser. No. 385,683, Aug. 6, 1973, abandoned. This application Feb. 5, 1974, Ser. No. 439,742**

**Claims priority, application Germany, Aug. 5, 1972, 2238714; Jan. 9, 1974, 2400886**

**Int. Cl.² B23P** *11/02*

**U.S. Cl. 29—447** **27 Claims**



1. A process for winding and unwinding parallel wire strands which consist of a multiplicity of adjacent parallel wires which are supplied in strand shape comprising the steps of:

a. fanning out said strand of wires so as to form at least one flat layer of individual wires disposed in generally parallel position,

b. winding said wires in flat layer form into a winding drum after first securing the leading ends of said wires in the interior of said drum, and

c. unwinding said wires from said drum and reforming said individual wires into their original cross-sectional shape.

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3,919,763

**METHOD OF MAKING A COOKING VESSEL**

**John B. Ulam, 134 Mount Blaine Drive, McMurray, Pa. 15317**

**Continuation of Ser. No. 235,282, March 16, 1972, abandoned. This application Oct. 29, 1973, Ser. No. 410,577**

**Int. Cl.² B23K** *31/02*

**U.S. Cl. 29—460** **14 Claims**

1. A method of making a cooking vessel from two pieces which form the bottom area of the vessel, said pieces having uninterrupted surfaces, comprising the steps of placing the two pieces face-to-face together, subjecting the pieces to subatmospheric pressure welding the two pieces together while they are under said subatmospheric pressure, said welding being performed along a continuous line to form between the pieces a hermetically sealed zone which is substantially devoid of bonding material and encompasses the bottom area of the vessel, said hermetically sealed zone being surrounded by the continuous line, and exposing the welded mating pieces to atmospheric pressure which forces the mating pieces toward the hermetically sealed zone therebetween.

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3,919,764

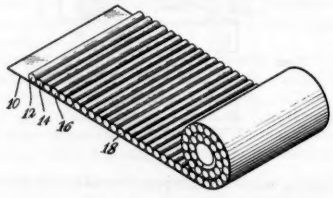
**METHOD OF MAKING METALLIC COMPOSITE MATERIALS**

**Aurel I. Berghezan, Rhode-St.-Genese, Belgium, assignor to Union Carbide Corporation, New York, N.Y.**

**Continuation of Ser. No. 831,170, June 6, 1969, abandoned. This application Nov. 15, 1971, Ser. No. 199,041**

**Int. Cl.² B23K** *35/16*

**U.S. Cl. 228—185** **2 Claims**




1. A process for the preparation of a composite material which comprises the steps of:

a. depositing on a sheet of a metal matrix to form as assembly, a single layer of a plurality of matrix members and reinforcing members, said reinforcing members being distributed evenly and throughout said layer, and all of said members being aligned parallel to each other and held apart solely by the volume of adjacent members.

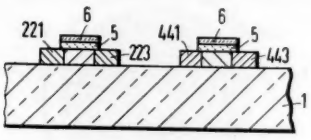
b. subjecting said assembly to a metal working process wherein the metal matrix and matrix members are integrally bonded.

3,919,765

## METHOD FOR THE PRODUCTION OF INTEGRATED CIRCUITS WITH COMPLEMENTARY CHANNEL FIELD EFFECT TRANSISTORS

Heinrich Schloetterer, Putzbrunn-Solalinden, Germany, assignor to Siemens Aktiengesellschaft, Berlin & Munich, Germany

Filed Mar. 28, 1974, Ser. No. 455,590
Claims priority, application Germany, Mar. 30, 1973, 2316095
Int. Cl.² B01J 17/00
U.S. Cl. 29—571 9 Claims




1. A method for producing an integrated circuit having at least two complementary field effect transistors which includes taking a semiconductor body which has dopings of both impurity types, one doping being in greater concentration than the other, gettering one region thereof of its predominant dopant where one transistor is to be formed to reverse the predominant doping therein, and protecting a second region of said body where a second transistor is to be formed to maintain its original dopings in the original concentrations, and forming a field effect transistor in each of said regions whereby the channels of the two transistors have different predominant dopings, thereby providing complementary field effect transistors.

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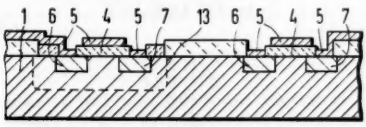
3,919,766

## METHOD FOR THE PRODUCTION OF INTEGRATED CIRCUITS WITH FIELD EFFECT TRANSISTORS OF VARIABLE LINE CONDITION

Heinrich Schloetterer, Putzbrunn-Solalinden, Germany, assignor to Siemens Aktiengesellschaft, Berlin & Munich, Germany

Filed Mar. 28, 1974, Ser. No. 455,591
Claims priority, application Germany, Mar. 30, 1973, 2316096
Int. Cl.² B01J 17/00
U.S. Cl. 29—571 8 Claims



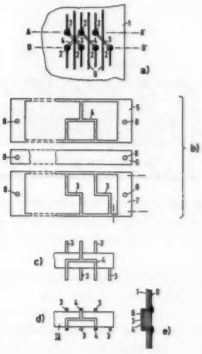

1. A method for producing an integrated circuit having at least two field effect transistors with different starting potentials which includes taking a semiconductor body which has a predominant doping of one impurity type, gettering one region thereof where one transistor is to be formed to reduce the predominant doping therein, and protecting a second region thereof where a second transistor is to be formed, and forming a field effect transistor in each of said regions in which the channels of the two transistors have the same type impurities but of different concentration.

3,919,767

## ARRANGEMENT FOR MAKING METALLIC CONNECTIONS BETWEEN CIRCUIT POINTS SITUATED IN ONE PLANE

Karl Maaz, Nurnberg, Germany, assignor to Siemens Aktiengesellschaft, Munich, Germany

Continuation of Ser. No. 269,839, July 7, 1972, abandoned.
This application Mar. 25, 1974, Ser. No. 454,697
Claims priority, application Germany, July 27, 1971, 2137587
Int. Cl.² H01R 43/00
U.S. Cl. 29—628 3 Claims




1. A method for manufacturing metallic electric connectors for circuit points lying in the same plane on a carrier plate, comprising the steps of:

a. preparing first and second rectangular copper foils of equal size;

b. etching central portions of said first and second copper foils to form conductive paths which cross each other when aligned, said etching being controlled so that said paths are contained within a solid rectangular border at the edges of said rectangular foil;

c. tinning said etched copper foils;

d. inseting a rectangular sheet of insulating material having a length essentially the same as said foils and having a width substantially narrower than that of said foils between the etched copper foils so that the long edges of said foils extend out from said insulating material;

e. cementing said copper foils to said insulating material;

f. cutting away the exposed borders on both sides of said insulating material to form a layered comb, the tines of which form the conduction paths between circuit points; and

g. bending the tines for insertion into openings in a carrier plate to permit soldering and connecting of the circuit points.

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3,919,768

## METHOD OF TUNNEL CONTAINING STRUCTURES

Richard D. Pittman, Thousand Oaks; Norman J. Grossman, Malibu, and Ronald E. Johnson, Inglewood, all of Calif., assignors to Northrop Corporation, Los Angeles, Calif.

Filed Jan. 2, 1973, Ser. No. 320,066
Int. Cl.² H01F 3/00
U.S. Cl. 29—604 16 Claims

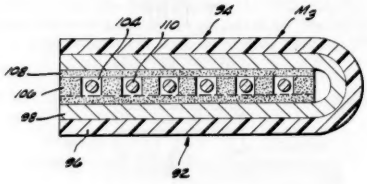
1. The method of making a three dimensional structure of selected size in each dimension formed of a polymerizable radiation activatable material, said method comprising:

a. depositing a first layer of a radiation active material on a substrate,

b. exposing said first layer to a source of radiation having a spectral distribution compatible with the spectral response of said radiation active material to only partially activate said layer,

c. immediately thereafter depositing a second layer of radiation active material on said first layer to permit co-polymerization of said two layers between the interface therebetween to thereby permanently bond said two layers,

d. baking said structure to homogenize the interface between said layers,




e. selectively exposing selected portions of said second layer to a source of radiation having a spectral distribution compatible with the spectral response of said material in said second layer,

f. and treating said last named layer with an agent capable of removing the portions thereof not exposed to the source of radiation so as to remove the non-exposed portions leaving the selected exposed portions.

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**3,919,769**

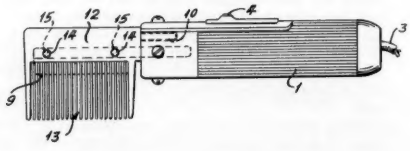
**BARBERING TOOL**

**Robert E. Horn, 4866 Viento Drive, St. Louis, Mo. 63129**

**Filed Apr. 16, 1973, Ser. No. 351,422**

**Int. Cl.[2] B26B** *21/38*

**U.S. Cl. 30—30** **1 Claim**




**1.** A barbering tool comprising a cutting blade element and a comb element disposed in substantially parallel relation with each other but spaced apart, the comb element including teeth projecting beyond the cutting edge of the blade element, means preventing movement of the blade crosswise of the comb teeth and for precisely varying the spacing between the blade and comb elements transversely of their respective planes, said blade and comb elements forming a single unit, and an elongated handle extending parallel to the cutting edge of the blade and mounting said unit for simultaneous movement of both said elements through a person's hair and including a motor which reciprocates said unit relative to said handle solely in a direction parallel to the comb teeth and normal to the cutting edge of the blade.

**3,919,770**

**OUTER CUTTING BLADE FOR ELECTRIC DRY SHAVER**

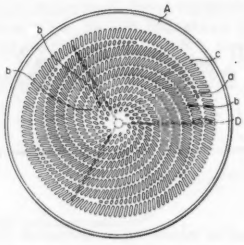
**Satoshi Sakai, Hirakata; Norio Shimizu, Neyagawa, and Junji Nomura, Takatsuki, all of Japan, assignors to Matsushita Electric Works, Ltd., Osaka, Japan**

**Filed Sept. 10, 1973, Ser. No. 395,403**

**Claims priority, application Japan, Sept. 13, 1972, 47-92442; Nov. 9, 1972, 47-129080[U]The portion of the term of this patent subsequent to June 17, 1992, has been disclaimed.**

**Int. Cl.[2] B26B** *19/14*

**U.S. Cl. 30—43.6** **5 Claims**




**1.** A cutting blade assembly for a dry shaver including a circular stationary blade in the form of a thin metallic membrane and a rotating blade having a generally radially oriented cutting edge rotating concentrically against the stationary blade, the stationary blade having a plurality of uniformly interfitting smoothly continuous spiral ribs, adjacent ribs having formed between them a plurality of elongated hair inlet openings with adjacent openings closely spaced generally parallel to one another and with the longitudinal dimension of each opening spanning the space between adjacent ribs, the ribs being more closely spaced as they spiral inwardly toward the center with the length of the openings being correspondingly reduced, the openings having a slight incremental angle between them so that adjacent openings bear substantially the same shallow angle with respect to the blade, with the longitudinal dimension of each opening extending in a symmetrically angled but generally radial direction.

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**3,919,771**

**DEVICE FOR RETAINING A LOWER DENTURE IN POSITION**

**Philippe-Charles Ostermann, Lammstrasse 10, D 763 Lahr, Germany**

**Filed May 14, 1973, Ser. No. 359,780**

**Claims priority, application France, May 18, 1972, 72.18389**

**Int. Cl.[2] A61C** *13/00*

**U.S. Cl. 32—2** **6 Claims**

**1.** In combination with an elongated lower denture, a device for retaining said denture in position, comprising a fixing element secured to and extending downwardly from one end

of the denture, said fixing element including a retaining tongue which curves downwardly and outwardly below the denture to fit into the hollow of the lower maxillary bone of the wearer of the device to retain the denture against undesired upward and outward movement said tongue being mounted for vertical sliding movement in and relative to said fixing element thereby to permit proper positioning of the retaining tongue relative to said bone.

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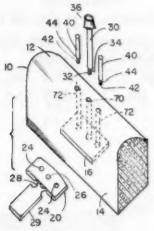
**3,919,772**

## DENTAL IMPLANT ASSEMBLY AND METHOD FOR ATTACHING THE SAME TO THE JAW BONE

**Joseph J. Lenczycki, 89 Florence Road, Riverside, Conn. 06878**

**Filed June 4, 1973, Ser. No. 366,853**
**Int. Cl.² A61C** *13/00*
**U.S. Cl. 32—10 A** **11 Claims**




**1.** Dental implant assembly for maintaining a dental prosthetic device in fixed relation with respect to a jaw bone, the implant assembly comprising a planar member adapted to be introduced into a blind generally transverse complementary cavity formed in the jaw bone without extending exteriorly therefrom; and securing means engageable through a bore substantially normal to the cavity with said planar member for immobilizing the latter within the cavity relative to the jaw bone, a portion of said securing means including support means projecting exteriorly of the jaw bone when said planar member and said securing means are in engagement, said support means being adapted to support a dental prosthetic device in fixed relation to the jaw bone during such engagement, said planar member comprising a flat plate having at least one threaded aperture therethrough, said securing means comprising a threaded fastener configurated to pass through a hole drilled in the jaw bone and engageable with said threaded aperture, three threaded apertures being provided in said flat plate, and three threaded screws being provided each of which being engageable with a respective one of said threaded apertures subsequent to passage through holes drilled in the jaw bone.

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**3,919,773**

## DIRECT MOLDABLE IMPLANT MATERIAL

**Frank Hubert Freeman, Farmington, Mich., assignor to Sybron Corporation, Rochester, N.Y.**

**Filed Dec. 20, 1973, Ser. No. 426,899**
**Int. Cl.² A61C** *13/00*
**U.S. Cl. 32—10 A** **17 Claims**

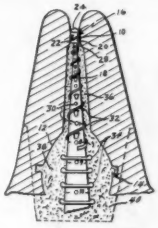
**1.** A moldable, direct dental implant material insertable into a tooth root socket immediately after tooth extraction for polymerizing in situ, comprising a polymerizable, thermosetting organic resin binder, an inorganic filler admixed wtih said binder and a particulate coating the outer surface of said moldable material, said particulate being biologically acceptable, soluble in body fluids and of a particle size sufficient to produce pores of preselected size in the outer surface of said implant material when said particulate is dissolved by body fluids after said implant material is hardened.

**3,919,774**

## COMBINATION ENDODONTIC APICAL SEALER AND CROWN POST

**Mark J. Fishman, 877 E. 54th St., Brooklyn, N.Y. 11234**

**Filed Aug. 28, 1973, Ser. No. 392,382**
**Int. Cl.² A61K** *5/02*
**U.S. Cl. 32—15** **9 Claims**



**5.** An apical sealing element for sealing the apex of a tooth root canal which has been instrumented to a predetermined size at said apex while providing a post for a post-core crown build up comprising

a frusto-conical solid of revolution of a size corresponding to the dimensions of the apical end of said root canal,

means on the outer periphery of said frusto-conical solid of revolution and projecting therefrom for sealing said solid of revolution to the apical end of a root canal, and

means at the larger end of and integral with said solid of revolution forming a post for a post-core crown build up the end of said post at said solid of revolution having a cross sectional area less-than the largest cross sectional area of said solid of revolution.

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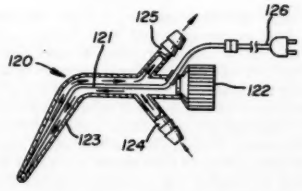
**3,919,775**

## ENDODONTIC SEALING SYSTEM AND APPARATUS

**Oscar Malmin, 127 E. Wayne Ave., Akron, Ohio 44301**

**Division of Ser. No. 213,993, Dec. 30, 1971. This application June 11, 1973, Ser. No. 368,480**
**Int. Cl.² A61C** *5/02*
**U.S. Cl. 32—57** **7 Claims**




**1.** A plugging instrument adapted to apply a sealing plug to a root canal for use with an ultrasonic dental instrument and with a source for supplying heating and cooling fluid, comprising;

A. an elongate angular shank having first and second end;

B. attachment means on said first end of said shank

1. whereby said plugging instrument may be releasably attached to said ultrasonic dental instrument;

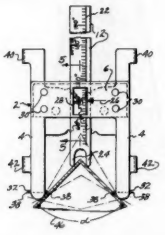
C. the second end of said shank having a generally elongate tapering conical configuration; and

D. said shank being hollow and carrying attachment means for connection to said source of heating and cooling fluid whereby said fluid may be circulated interiorly of said shank.

## 3,919,776
## MEASURING APPARATUS

Terrence H. Upton, 2218 W. Granville Ave., Chicago, Ill. 60645

Filed Feb. 21, 1974, Ser. No. 444,336
Int. Cl.² G01B 3/56
U.S. Cl. 33—1 N 4 Claims



1. Measuring apparatus comprising a carriage having a front wall provided with an aperture, a pair of fixed dependent legs, an elongate scale slidably mounted in said carriage and being located between said legs an equal distance from each leg, and being viewable in said aperture, a back wall, a pair of legs pivotally mounted on said back wall, said last named legs being in mesh and pivoting in unison an equal amount in opposite directions to measure an interior or an exterior angle.

## 3,919,777
## ANGLE TRISECTOR

William M. Moore, 1578 Scotty St., San Jose, Calif. 95122

Continuation-in-part of Ser. No. 42,724, June 2, 1970, Pat. No. 3,693,261. This application Mar. 22, 1972, Ser. No. 237,033
Int. Cl.² G01B 3/00; B43L 9/08
U.S. Cl. 33—1 AP 1 Claim

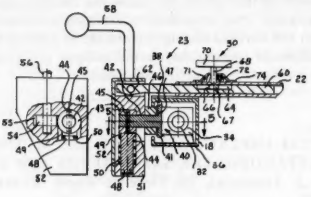
1. An angle divider comprising a single transparent blade having a bore at one end, said blade having a straight line marked thereon in aligned relation to said bore, a pair of curved edges on said blade on opposite sides of said line, the curved edges of said blade being formed by equal segments of arcs extending from said line and having their centers as said bore, the relationship to each other of the curved edges of said blade determining the angular fraction of an angle to be divided, the intersection of lines drawn along said curved edges determining the angular fraction when said line coincides with the legs of the angle to be divided.

## 3,919,778
## DRAFTING MACHINE

Mark B. Dundore, 12 W. Brook Drive, Akron, Pa. 17502

Filed July 1, 1974, Ser. No. 484,468
Int. Cl.² B43L 13/02
U.S. Cl. 33—80 10 Claims

1. A drafting machine comprising, in combination, a base detachably mounted on a drawing board, said base comprised of a pair of parallel spaced apart arms, a parallel rule extending between said arms, means for connecting said parallel rule to said arms for slidable movement with respect thereto, template means slidably mounted on said parallel rule, and means on said rule including a first shaft extending horizontally into said rule for slidable telescopic movement with respect thereto and extending between said rule and said connecting

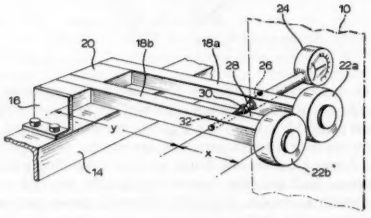


means for adjusting the lateral position of said rule relative to said arms.

## 3,919,779
## THICKNESS GAUGE DEVICES

David C. Piggott, Burlington, Canada, assignor to PCL Industries Limited, Willowdale, Canada

Filed Sept. 4, 1974, Ser. No. 503,150
Int. Cl.² G01B 5/06
U.S. Cl. 33—147 L 5 Claims




1. A thickness gauge device comprising a pair of cooperating arm members rigidly connected together and having spaced resilient coextending parts, a pair of opposed roller members mounted respectively on the coextending parts of the arm members for rotation about parallel axes, said pair of roller members being urged toward each other by the resilience of said coextending parts to embrace a body whose thickness is to be measured thereby, and moved apart by flexing of the coextending parts when the body is therebetween, to produce a corresponding apart movement of the coextending parts, and a gauge device mounted on the coextending parts to measure the said apart movement thereof produced by the said body.

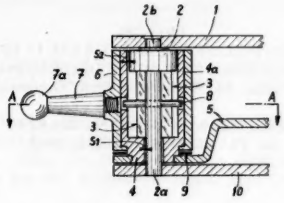
## 3,919,780
## LENGTH-MEASURING INSTRUMENT

Hans Meyer, Bugnon, 24, Renens, Vaud, Switzerland

Filed June 18, 1974, Ser. No. 480,507
Claims priority, application Germany, June 22, 1973, 2332519
Int. Cl.² G01B 3/22
U.S. Cl. 33—172 B 5 Claims

1. Lever-controlled calipers comprising a stationary case, a cylindrical body rotatably mounted inside said case, said body having an axial hollow opening therein, a feeler lever radially carried by said body, a further lever rigid with said body, an indicator mechanism controlled by said further lever, a torsion-resisting connection between the case and the body, including means extending axially within said body opening and rigid with said case, at least three springs within the body opening and distributed around said means, each of said

springs attached to both said last-mentioned means and said rotatably mounted body, the resistance of the springs against



radial bending being larger than their resistance against axial twisting.

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**3,919,781**

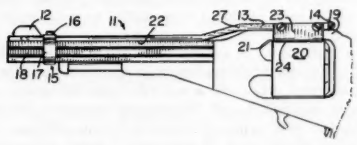
## SIGHT-MOUNTING BARS FOR PISTOLS

**Harry P. Chaba, 520 Moraine Road NE., Calgary, Alberta, Canada (T2A 2P2)**

**Filed June 17, 1974, Ser. No. 480,154**

**Int. Cl.[2] F41G** *1/42, 11/00*

**U.S. Cl. 33—233** **9 Claims**



**1.** A sight-mounting attachment for a pistol having a barrel and a gun frame structure assembled with said barrel comprising an elongate bar having a length greater than the length of said barrel and contoured to be assembled in longitudinally aligned overlying contacting relation upon upper surfaces of said gun barrel and gun frame, said bar carrying spring clip means dependingly supported by the forward end of said bar for frictionally engaging a forward part of the gun barrel, and having a rearward portion of rectangular section carrying a pair of spaced clamp leg means each of the pair of spaced clamp leg means disposed on opposite sides of and depending from the side surfaces of said rectangular-section portion of said bar in the same direction as said spring clip means, said bar and clamp leg means being formed to cause said clamp leg means to releasably clampedly engage with side surfaces of said gun frame and simultaneously to urge the underside of said bar against an upper surface of said gun frame.

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**3,919,782**

## MAGNETIC COMPASS ASSEMBLY

**Denis Maurice Vaucher, La Neuveville, Switzerland, assignor to Recta Manufacture d'Horlogerie S.A., Beinne, Switzerland**

**Filed Apr. 3, 1974, Ser. No. 457,557**

**Claims priority, application Switzerland, Apr. 6, 1973, 4973/73**

**Int. Cl.[2] G01C** *17/10*

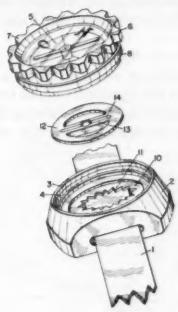
**U.S. Cl. 33—349** **11 Claims**

**1.** A compass assembly comprising:

A. a casing having a circular open mouth and a bottom,

B. a transparent compass capsule detachably receivable within the mouth of said casing and turnable therein, said capsule having a compass scale and a magnetic needle which is movable relative to said compass scale, and

C. a sighting element having a line-of-sight formed thereon, said element being interposed between said capsule and the bottom of said casing and being adjustable to assume



a selected angular setting relative to the circular mouth which satisfies the habits of the user.

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**3,919,783**

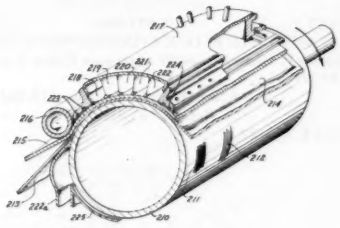
## METHOD FOR HOT GAS HEAT TRANSFER, PARTICULARLY FOR PAPER DRYING

**Anthony J. Cirrito, 41 Old Upton Road, Grafton, Mass. 01519**

**Continuation of Ser. No. 129,165, March 29, 1971, abandoned, which is a continuation of Ser. No. 705,778, Feb. 15, 1968, abandoned. This application May 9, 1973, Ser. No. 358,498**

**Int. Cl.[2] F26B** *3/00*

**U.S. Cl. 34—23** **20 Claims**



**1.** The method of supplying heat for heat transfer, which includes producing clean hot high pressure combustion gases by mixing fuel and oxygen-bearing gases in a confined primary space, combusting said mixture to produce hot high pressure gases as combustion products, expanding at least a portion of said combustion products in the actuation of compressor means whereby to compress additional oxygen-bearing gases, mixing at least a portion of the latter with additional fuel in a secondary combustion space at substantially higher temperatures, and combining the hot high pressure gases from said secondary combustion space with exhaust gases derived from the actuation of said compressor means.

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**3,919,784**

## SOLAR PRE-HEAT CHAMBER FOR GRAIN DRYERS

**Martin H. Tonn, Amboy, Minn. 56010**

**Filed Dec. 21, 1973, Ser. No. 427,146**

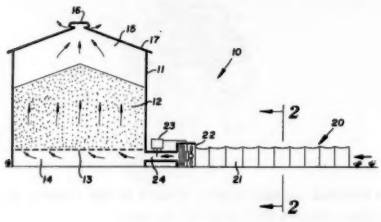
**Int. Cl.[2] F24J** *3/02*

**U.S. Cl. 34—93** **1 Claim**

**1.** In a crop-drying system including a grain-confining bin having generally inperforate top and side walls, venting means at the top of said bin, and grain-supporting perforate base means adjacent the base of said bin, said imperforate side and top walls, and said grain-supporting perforate base defining a

grain-drying chamber, impeller means for forcibly delivering drying air to a zone beneath said grain-supporting perforate base for passage through said drying chamber and including solar energy extracting means for heating said drying air prior to passage through said drying bin, said solar energy extracting means comprising:

a. an elongated solar heating chamber having one end in direct communication with the input end of said impeller means, and with the opposed remote end in communication with atmosphere, and comprising frame means with generally water impermeable bottom, side and top walls,




said walls being wrapped about said frame means and defining said solar heating chamber, said solar heating chamber having a length-to-width dimension ratio of at least about 10;

b. said bottom wall being an opaque flexible cohesive film, highly absorbant to solar radiation, with said side and top walls being transparent flexible cohesive films, highly transmissive to solar radiation; and

c. the input end of said impeller means receiving drying air from said elongated solar heating chamber and from the ambient.

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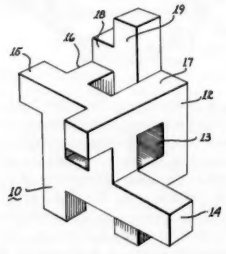
**3,919,785**

**MODULAR BLOCK CONSTRUCTION SYSTEM**

**Stephen P. Generaux, 3450 Algonquin Circle, Las Vegas, Nev. 89109**

**Filed Nov. 1, 1974, Ser. No. 519,983**
**Int. Cl.[2] A63H** *33/08*
**U.S. Cl. 35—27** **3 Claims**




**2.** A module for a modular construction block set having modules which interfit to form a desired construction assembly, each module comprising:

a block of generally cubical shape, wherein

every face of the block is a square having side dimensions of three units in length; and

a plurality of the faces of the block include a square shaped indentation located concentric to the face and having side dimensions of one unit in length; and

a projection extending perpendicularly outward from a face of the block, wherein

said projection is located eccentric to the face from which it extends; and

said projection has a square cross-sectional shape having a side dimension of one unit in length;

each module being thereby adapted to interfit with another module by inserting a projection of one module into an indentation of the other module.

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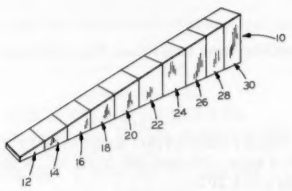
**3,919,786**

**SEGMENTED INCLINED PLANE FOR USE IN TEACHING CHILDREN THE CONCEPT OF DIRECTIONALITY**

**Eileen R. Taska, 14 Wildflower Trail, Greenwich, Conn. 06830**

**Filed May 3, 1974, Ser. No. 466,523**
**Int. Cl.[2] G09B** *17/00*; **A63H** *33/06*
**U.S. Cl. 35—35 J** **4 Claims**




**1.** A teaching kit particularly suited for use in instructing children having learning disabilities manifested as left to right sequencing problems and an aversion to graphic representation which have inhibited their ability to read, to learn the concepts of directionality comprising:

a. a multiplicity of disarranged segments having differing heights assembable solely in an array selected from a first patterned array and a second patterned array, each of said multiplicity of disarranged segments including a bottom wall, a pair of end walls having differing heights, a pair of side walls of substantially equal dimensions and a sloped top wall, each of said pair of side walls of said multiplicity of disarranged segments having the same length and each of said pair of end walls of said multiplicity of disarranged segments having the same width so that all of said multiplicity of disarranged segments have substantially the same length and substantially the same width, one of said pair of end walls of each of said multiplicity of segments having substantially the same height as one of the pair of end walls of one of the other remaining segments of said multiplicity of segments wherein when said multiplicity of segments is selectively assembled in said first patterned array said multiplicity of segments are assembled in abutting relation in order of increasing height with said top walls of said multiplicity of segments providing a continuous plane of increasing inclination and when said multiplicity of segments is selectively assembled in said second patterned array said multiplicity of segments are assembled in abutting relation in order of decreasing height with said top walls of said multiplicity of segments providing a continuous plane of decreasing inclination; and

b. a reading script comprising textual material consisting of a first story containing instructions for manually selecting from said multiplicity of disarranged segments the one of said multiplicity of disarranged segments having the least height and for manually assembling in abutting relation beginning with said one of said multiplicity of segments of the least height the remainder of said multiplicity of segments in sequential left to right order of increasing height to form a three-dimensional representation of said first story comprising said first patterned array, and a second story containing instructions for manually selecting from said multiplicity of disarranged segments the one of said multiplicity of disarranged segments having the greatest height and for manually assembling in abutting relation beginning with said one of said multiplicity of segments of greatest height the remainder of said multi-

plicity of segments in sequential left to right order of decreasing height to form a three-dimensional representation of said second story comprising said second patterned array.

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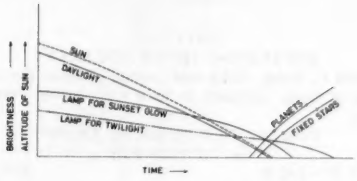
## 3,919,787
## AUTOMATIC LIGHT CONTROL SYSTEM FOR DEMONSTRATING SUNRISE AND SUNSET SCENES IN PLANETARIUM

**Takeshi Bessho, Hisai, Japan, assignor to Minolta Camera Kabushiki Kaisha, Osaka, Japan**

**Filed Nov. 29, 1974, Ser. No. 528,183**
**Claims priority, application Japan, Dec. 25, 1973, 48-49352[U]**
**Int. Cl.² G09B 27/00**
**U.S. Cl. 35—42.5** **7 Claims**




**1.** A planetarium apparatus comprising:
daylight lamps for the basic illumination of a dome,
first light control means for automatically varying the brightness of the daylight lamps,
lamps of the proportion type variable in brightness in proportion to a change in the brightness of the daylight lamps;
second light control means for varying the brightnesses of the proportion-type lamps in proportion to a change in the brightness of the daylight lamps and for controlling the timing for varying the brightnesses thereof,
lamps of the inverse proportion type variable in brightness in inverse proportion to a change in the brightness of the daylight lamps, and
third light control means for varying the brightnesses of the inverse proportion-type lamps in inverse proportion to a change in the brightness of the daylight lamps and for controlling the timing for varying the brightnesses thereof.

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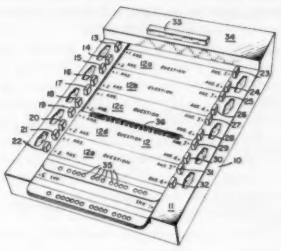
## 3,919,788
## QUIZ SHEET AND METHOD AND APPARATUS FOR PRODUCING SAME

**Frank Ingeneri, Santa Clara, Calif., assignor to Self Development Inc., San Jose, Calif.**

**Continuation-in-part of Ser. No. 629,604, April 10, 1967, Pat. No. 3,540,138, and a continuation-in-part of Ser. No. 882,420, Dec. 5, 1969, Pat. No. 3,626,608. This application Apr. 16, 1970, Ser. No. 29,047**
**Int. Cl.² G09B 7/00**
**U.S. Cl. 35—48 B** **2 Claims**

**1.** In an article of manufacture of the class described the combination comprising a member having an array of legends arranged in a predetermined sequence, a sheet with a predetermined number of questions recorded thereon, each of said questions having a choice of answers associated therewith and only one of said answers being correct, said member having means for receiving said sheet so that said answers are positioned opposite selected ones of said legends when said sheet is placed on said member in a predetermined orientation, means at the upper portion of said member having recorded thereon a second array of legends which have a predetermined relation to said first mentioned array of legends, said second array of legends also being arranged in a predetermined sequence, the top of said sheet being adapted to be placed adjacent to said second array of legends so that marks may be placed on the top of said sheet opposite said second array of legends which correspond to said first mentioned legends which are opposite the correct answers to said questions, said means at the upper portion of said member being provided



with an additional legend which is identified with different multiple choices of answers to said questions, said sheet being marked opposite said additional legend when the answers to said questions are of a predetermined multiple choice.

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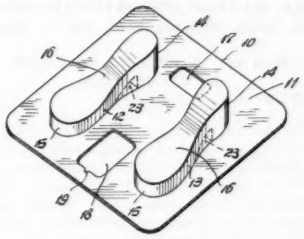
## 3,919,789
## SET OF FITTING AIDS

**John S. Hosking, Shelton, Conn., assignor to William W. Boufard, Shelton, Conn., a part interest**

**Filed Jan. 20, 1975, Ser. No. 542,181**
**Int. Cl.² A43B 00/00**
**U.S. Cl. 36—1** **10 Claims**

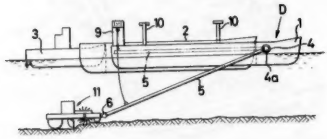


**8.** A fitting aid which simulates the height of a particular pair of modern platform shoes having a particular conventional shoe platform height, said aid being adapted for use in place of platform shoes in connection with the determination of the proper length of a floor-length garment to be worn with platform shoes having a particular conventional shoe platform height, said fitting aid comprising a support and a matched pair of elevated platforms fixed to the support and spaced at an angle and distance corresponding to a normal stance, each platform having an elevated heel section and a lower elevated sole section and a continuous, sloping upper surface adapted to receive a shoeless foot whereby a person being fitted for a floor-length garment can stand upon said member, one shoeless foot on each platform, to be elevated a distance above floor level corresponding to the conventional height of said particular pair of modern platform shoes.

## 3,919,790
## PUSHED SUCTION DREDGER AND BARGE COMBINATION

**Michio Sasaki, Funabashi, and Keizo Kikui, Kamagaya, both of Japan, assignors to Mitsui Shipbuilding & Engineering Co. Ltd., Tokyo, Japan**

**Filed July 9, 1974, Ser. No. 486,871**
**Claims priority, application Japan, July 11, 1973, 48-78647**
**Int. Cl.² E02F 3/88**
**U.S. Cl. 37—66** **3 Claims**



1. A dredger for use with a push boat comprising a barge, a floating vessel having a recess designed to receive said barge therein and an opening through which silt and the like is discharged out into the barge, conduit arms rotatably supported along opposite sides of the bow of said vessel and communicated into the inside of the vessel, and a dredging and suction unit pivotally joined to the other end of said conduit arms, said dredging and suction unit comprising an underwater pump, a bellmouth connected to said pump, a bucket wheel disposed in front of said bellmouth, guide means comprising skids at the front and rear of said unit mounting said bucket wheel for displacement along the upper surface of said sea bottom with said bucket wheel penetrating the upper layer of said sea bottom to a predetermined depth, and conduits connecting said underwater pump to said conduit arms, whereby dredging of the sea bottom is practiced by pushing said barge and vessel with said push-boat and operating said dredging and suction unit.

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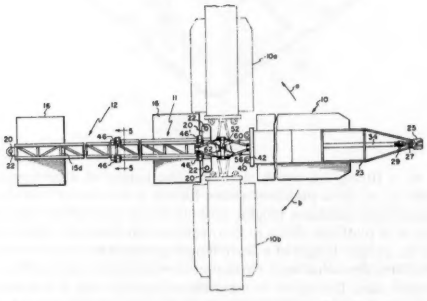
## 3,919,791
## DREDGER HAVING SEPARATELY FLOATING DREDGE AND TAIL SECTIONS AND METHOD OF DREDGING

**Leward N. Smith, Millbrook Road, Rte. 1, Remus, Mich. 48757**

**Filed Nov. 19, 1973, Ser. No. 417,097**
**Int. Cl.² E02F 3/88**
**U.S. Cl. 37—67** **10 Claims**



1. Apparatus for excavating material, such as earth, from an underwater basin to enlarge the basin, comprising:
a floatable tail section;
a longitudinally aligned separately floated dredge section, displaceable longitudinally relative to the tail section, and including a dredging head for digging and collecting material to be dredged;
means for selectively anchoring said tail section in position;
means connecting the dredge section with said tail section for forward longitudinal movement relative to the tail section, and for generally horizontal swinging movement relative to the tail section in various relative longitudinal positions of the dredge section and tail section when the tail section is anchored in position and the dredge section is unanchored;
means for incrementally forwardly bodily longitudinally indexing said dredge section to various positions of extension relative to said tail section;
and means reactive between said tail and dredge sections for swinging said dredge section relative to said tail section in various relative longitudinally extended positions of said dredge section from said tail section, when the tail section is anchored and the dredge section is unanchored, to dredge material from said basin.

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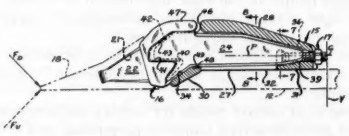
## 3,919,792
## EXCAVATING TOOTH ASSEMBLY

**Frederick C. Hahn, Aloha, and Larren F. Jones, Beaverton, both of Oreg., assignors to Esco Corporation, Portland, Oreg.**

**Filed Nov. 25, 1974, Ser. No. 526,589**
**Int. Cl.² E02F 9/28**
**U.S. Cl. 37—142 R** **25 Claims**

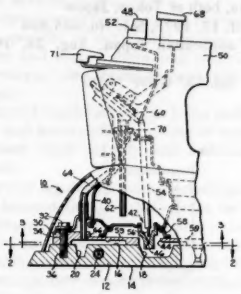


1. An excavating tooth assembly comprising a socket member and a tooth member, said socket member having top, bottom, rear and side walls providing a socket for receipt of a shank of said tooth member, said bottom wall being rearwardly convergent relative to said top wall and said side walls being rearwardly convergent relative to each other, said tooth member having a tapered forward end and a relatively elongated shank at its rear end, said shank being tapered complementarily to said socket member convergent walls and being movable along a generally linear path into assembled relation with said socket member,
said shank rear end being equipped with a bolt-head receiving recess and said socket member rear wall being equipped with an aperture, a bolt assembly in said recess and aperture for maintaining said tooth member in assembled relation with said socket member,
said top and bottom walls each having internal bearing surfaces for transmitting beam loads on said tooth member to said socket member, a portion of said bottom wall internal bearing surface being positioned adjacent the forward end of said socket member and being more steeply inclined to said path than the portion of said bottom wall internal bearing surface adjacent said rear wall,
said tooth member having a massive section in the portion thereof immediately rearward of said tapered forward end to transmit a substantial portion of a downward beam load to said forward portion of said bottom wall bearing surface, said bottom wall being relatively thicker in said forward portion than the remainder thereof to provide a pad-like part for receiving said downward beam load,
said side walls being equipped with forwardly projecting ears spaced above said bottom wall forward portion and said tooth member being complementarily recessed to receive said ears to provide means for transmitting a portion of an upward beam load.

## 3,919,793
## EXTRA CAPACITY STEAM IRON

**Kaj Toft, Upland, and Wendell C. Walker, Alta Loma, both of Calif., assignors to General Electric Company, Bridgeport, Conn.**

**Continuation-in-part of Ser. No. 424,568, Dec. 13, 1973. This application Dec. 10, 1974, Ser. No. 531,357**
**Int. Cl.² D06F** *75/06*
**U.S. Cl. 38—77.83** **15 Claims**



**1.** An extra capacity steam iron comprising:
a soleplate;
a heating element for heating said soleplate;
cover means on said soleplate;
said soleplate and said cover means defining therebetween primary plenum means, secondary plenum means independent of said primary plenum means, first steam generating means communicating with said primary plenum means, and second steam generating means independent of said first steam generating means communicating with said secondary plenum means;
and supply means for selectively supplying water to said first steam generating means and for selectively supplying water to said second steam generating means,
said soleplate having a plurality of primary ports therethrough communicating only with said primary plenum means such that water supplied to said first steam generating means is converted to steam and discharged from the iron through said primary ports, and said soleplate having at least one secondary port therethrough communicating only with said secondary plenum means such that water supplied to said second steam generating means is converted to steam and discharged from the iron through said secondary port.

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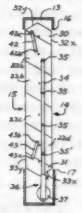
## 3,919,794
## MULTIPLE MESSAGE SIGN APPARATUS

**E. Tait Hunter, Jr., 384 Redwood Drive SW., Marietta, Ga. 30060**

**Filed Sept. 21, 1973, Ser. No. 399,537**
**Int. Cl.² G09F** *11/00*
**U.S. Cl. 40—30** **9 Claims**

**1.** Changeable message sign apparatus comprising:
support means including a pair of spaced apart frame members defining opposed sides of a message region including a pair of aligned spaced apart openings of viewing messages displayed in said message region;
an array of separate message support means disposed in said message region, each of said message support means having further means whereby the message support means are mounted for rotation on respective parallel coplanar axes;
each of said message support means having four message support sides which are parallel with the respective said axis of rotation and each of said four sides being spaced apart from the axis of rotation to define a parallelogram having a first pair and a second pair of parallel message support sides;
said message support means being juxtaposed for rotation on said axes between first and second positions whereat confronting sides of adjacent message support means substantially abut each other;
linkage means interconnecting each of each message support means for oscillation in unision between a first said position, placing all of the one message support sides of the first pairs of sides substantially in parallel plane alignment for viewing through one of said viewing openings and placing all of the other sides of said first pairs substantially in parallel plane alignment for viewing through the other of said viewing openings, and said second position, placing all of the one message support sides of the second pairs of sides substantially in parallel plane alignment for viewing through said one viewing opening and placing of the other sides of said second pairs substantially in parallel plane alignment for viewing through the other of said viewing openings;
a first end member having a first side and a second side defining the opposite nonparallel sides of an isosceles trapezoid, said first end member mounted parallel to and adjacent the message support means at one end of said array for selective oscillation between a first position and a second position;

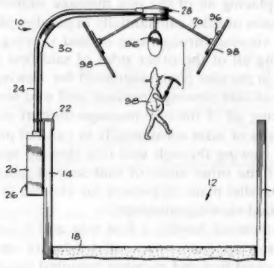


the first position of said first end member placing said first side thereof into a gap in said one viewing opening between a frame member and an offset side of said adjacent message support means, and the second position of said first end member placing said second side thereof into a gap remaining in said other viewing opening between said frame member and another offset side of said adjacent message support means; and
a second end member having a first side and a second side defining the opposite nonparallel sides of an isosceles trapezoid, said second end member mounted parallel to and adjacent the message support means at the other end of said array for selective oscillation between a first position and a second position,
the first position of said second end member placing said first side thereof into a gap remaining in said other viewing opening between the other frame member and an offset side of said adjacent message support means and the second position of said second end member placing said second side thereof into a gap remaining in said one viewing opening between said other frame member and another offset side of said adjacent message support means,
so that each viewing opening displays a complete first message or second message without any visible gaps at the ends of the array of message support means.

## 3,919,795
## MOTORIZED MOBILE

Sydney C. Van Horne Jinivisian, and Jaroslav R. Cerny, both of Los Angeles, Calif., assignors to Sydney C. Van Horne Jinivisian, Sherman Oaks, Calif.

Filed Sept. 23, 1974, Ser. No. 508,441
Int. Cl.[2] A63H *13/20*; G09F *11/02*
U.S. Cl. 40—33 10 Claims

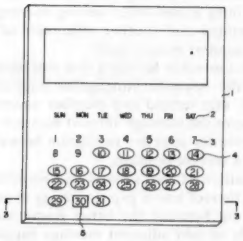



1. A motorized mobile comprising:
a body, means for supporting said body, first and second cam surfaces within said body;
a carrier rotatably mounted on said body for rotation about a first axis, means connected to said carrier for rotating said carrier with respect to said body on said first axis;
a display shaft rotatably mounted in said carrier for oscillatory rotation about a display shaft axis which is positioned at an angle with respect to said first axis, a cam follower on said display shaft, said cam follower being in engagement with said first and second cam surfaces so that oscillatory rotation of said display shaft about its axis is controlled by said cam faces as said carrier rotates within said body, means confining the movement of said display shaft, relative to said carrier, to oscillatory rotation about said display shaft axis.

## 3,919,796
## CALENDAR PROVIDED WITH SEALS

Fujio Shimazaki, No. 2429-1 Ichino, Hamamatsu, Shizuoka, Japan

Filed Mar. 29, 1974, Ser. No. 456,211
Claims priority, application Japan, Apr. 29, 1973, 48-51466; May 25, 1973, 48-59049; July 24, 1973, 48-87684
Int. Cl.[2] G09D *3/00*
U.S. Cl. 40—110 6 Claims

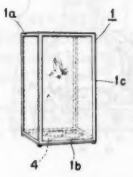



1. In a calendar provided with the days of the month imprinted seriatim on a base sheet, the improvement which comprises a plurality of individual removable seals affixed onto said base sheet, the surface of each of said seals contacting with said base sheet being coated with an adhesive substance and the cooperating base sheet surface being covered with a waxy coating, each one of said seals covering a different day indicia whereby said seals can be individually peeled off of said base sheet to uncover the day imprinted thereunder, and wherein each of said seals has the same day imprinted thereon as the day imprinted on said base sheet underneath said seal, so that a viewer may ascertain at a glance exactly what date seals have been stripped from the calendar.

## 3,919,797
## DISPLAY DEVICE

Kenji Murakami, Tokyo, Japan, assignor to Kenji Murakami and Tahee Tanaka, both of Tokyo, Japan

Filed Oct. 12, 1975, Ser. No. 405,890
Claims priority, application Japan, Aug. 29, 1973, 48-100584[U]
Int. Cl.[2] G09F *19/00*
U.S. Cl. 40—126 5 Claims

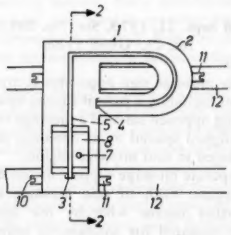



1. A display device, comprising a frame provided with upstanding members spaced apart from each other and laterally disposed top and bottom members connected thereto, transparent members mounted to and extending between said upstanding members, decorative panels mounted to said top and bottom members, said decorative panels being provided with a first groove extending across the surface thereof to opposite of said upstanding members and second grooves complimentary in configuration to said first groove and spaced therefrom, said first groove being wider in dimension than said second grooves, a transparent support plate having top and bottom edges fitted within said first groove in concealed relationship and side edges abutting said opposite of said upstanding members in concealed relationship, and an object to be displayed mounted on opposite sides of said transparent support plate.

## 3,919,798
## ILLUMINATED ADVERTISING DEVICE

Maximilian Friedrich Mutzhas, Pigersheimerstrasse 64, 8 Munich 90, Germany

Continuation of Ser. No. 123,202, March 11, 1971, abandoned. This application Sept. 12, 1973, Ser. No. 396,863
Int. Cl.[2] G09F *13/26*
U.S. Cl. 40—130 G 7 Claims




2. An advertising device comprising:
letter defining means;

fluorescent tube means mounted on said letter defining means;

current regulating means mounted on and carried by said letter defining means for delivering alternating current to said fluorescent tube means at a substantially constant current value independently of the load presented by the fluorescent tube means to thereby regulate light intensity at a substantially constant predetermined level;

rail means;

selectively attachable and detachable connecting means and operable to detachably connect said rail means and letter defining means;

alternating current supply means carried by said rail means and operable to detachably engage said letter defining means and supply alternating electrical current to said fluorescent tube means through said current regulating means;

said current regulating means being individually associated with said letter defining means to supply said current of constant value to only said associated letter defining means;

said current regulating means including body means housed said letter defining within means between a portion of said fluorescent tube means and an interior wall portion of said letter defining means, said body means including reflecting surface means extending longitudinally of said fluorescent tube means, and operable to reflect light from said fluorescent tube means toward side wall portions of said letter defining means.

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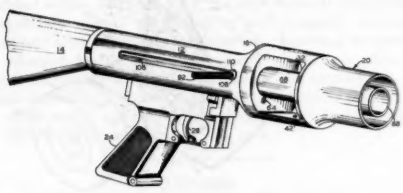
**3,919,799**

## GRENADE LAUNCHER AND ANNULAR CARTRIDGE THEREFOR

**Walter H. Austin, Jr., Castleton; John J. Busuttil, Schenectady, and Anthony J. Rinaldi, Troy, all of N.Y., assignors to United States of America as represented by the Secretary of the Army, Washington, D.C.**

**Filed June 4, 1974, Ser. No. 476,251**
**Int. Cl.[2] F41C** *27/06;* **F42B** *9/00, 13/16*
**U.S. Cl. 42—1 F** **8 Claims**



**1.** A firearm for launching grenade projectiles of annular configuration comprising,

a hollow receiver,

a barrel having a rifled bore of larger diameter than said receiver secured to the forward end thereof, said barrel having a transverse feedway therethrough rearwardly adjacent said rifled bore for retaining an annular grenade projectile in position to be fired therefrom,

a tubular member slidably disposed in said receiver for movement between a rearward position wherein said feedway is exposed for the insertion of an annular cartridge therein and a forward position passing through the annular projectile in supporting engagement therewith, and

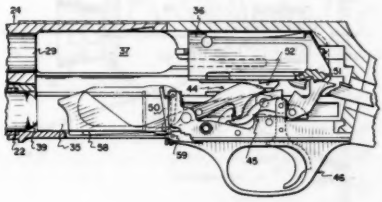
a charging handle projecting outwardly from said tubular member for imparting slidable movement thereto within said receiver between said forward and rearward positions thereof.

**3,919,800**

## FACILE LOADING REPEATING FIREARM

**Val A. Browning, Ogden, Utah, assignor to Browning Arms Company, Morgan, Utah**

**Filed Mar. 1, 1974, Ser. No. 447,159**
**Int. Cl.[2] F41C** *13/00*
**U.S. Cl. 42—17** **4 Claims**



**1.** In a side loading firearm having a barrel, a tubular magazine suspended beneath the barrel, a chamber bored into one end of said barrel, a receiver attached to communicate with said magazine and said chamber, means within the magazine to urge cartridges therein toward said receiver, and a breech bolt reciprocally mounted within said receiver to alternate between an open (loading) position and a closed (battery) position, the improvement which comprises:

a loading aperture in one side of the receiver constituting means for loading cartridges into the magazine;

a carrier member mounted within the receiver with a lowered position beneath the loading aperture and a lifted position to at least near the bottom of the chamber constituting means for carrying cartridges from the bottom portion of the receiver to the upper portion of the receiver in approximate alignment with the chamber when the breech bolt is in its loading position;

a latch mounted within the receiver biased normally to retain said carrier member in its lowered position and located to be released by contact of a cartridge resting on said carrier member so that said carrier member, once latched in its lowered position, will remain in said lowered position, except when both the breech bolt is in its loading position and a cartridge is located atop said member;

a cartridge stop member mounted to depend from said breech bolt so that when said breech bolt is in its battery position, said stop member constitutes means for retaining any cartridges stored in the magazine sufficiently far into the magazine to keep said loading aperture unobstructed so that there is room for another cartridge to be inserted therethrough;

means associated with said breech bolt for ejecting a cartridge from said chamber when the breech bolt is moved from its battery position to its loading position;

means associated with said breech bolt to force said carrier member into its lowered position when said breech bolt moves to its battery position;

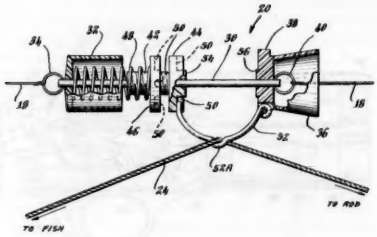
cartridge arrester means associated with said receiver normally held in a blocking position to prevent cartridges stored in the magazine from entering the receiver when the carrier member is in its lifted position; and

means associated with said cartridge arrester and said breech bolt for moving said arrester away from its blocking position in response to moving of the breech bolt to battery position, thereby to permit a cartridge from the magazine to come to rest against said cartridge stop member.

### 3,919,801
### FISHING EQUIPMENT

Philip D. Bart, 30-70 NE. 43rd St., Fort Lauderdale, Fla. 33306

Filed Jan. 2, 1974, Ser. No. 430,010
Int. Cl. A01k 97/12
U.S. Cl. 43—17 13 Claims




1. A release mechanism for releasing a fishing line comprising a central shaft, force loaded means axially positionable along said shaft, and a release pin engageable with said force loaded means and retaining a fishing line in said engageable position, said force loaded means placing a force on said release pin determined by said force loading, said release pin releasing said fishing line from said engagement when said fishing line exerts sufficient release force upon said pin to overcome said force loading.

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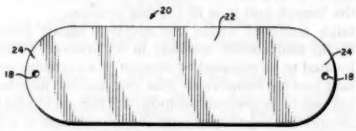
### 3,919,802
### PROCESS OF MAKING A FISHING LURE AND THE PRODUCT THEREOF

Lester M. Davis, Gig Harbor, Wash., assignor to Les Davis Fishing Tackle Co., Tacoma, Wash.

Filed Sept. 12, 1974, Ser. No. 505,245
Int. Cl.² A01K 85/00
U.S. Cl. 43—42.5 10 Claims




1. A fishing lure comprising a substantially rectangular sheet, a central portion provided with longitudinally extending flutes therein; and semicircular end portions, integral with said central portion, disposed with the circular portions thereof extending away from said central portion, having flutes therein which are extensions of the flutes in the central portion, and formed into oppositely facing concavo-convex configurations.

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### 3,919,803
### BUOYANT FISH BASKET

Jerry R. Manguso, Scottsdale, Ariz., assignor to Gene Weber, Scottsdale, Ariz., a part interest

Filed Sept. 19, 1974, Ser. No. 507,576
Int. Cl.² A01K 97/04
U.S. Cl. 43—55 1 Claim

1. A buoyant corrosion resistant fish basket including:
a. a flotation collar member formed of foamed buoyant plastic and selected to provide buoyancy for the entire basket when placed in water;
b. a flexible non-metallic mesh bag, the open end thereof secured to said flotation collar by wrapping the open end around said collar and stitching the edge of the open end to said bag;
c. a buoyant closure member formed of non-metallic material shaped and adapted to close the neck of said bag by engaging the underside of said flotation collar when said basket is placed in water; and

d. a hinge forming non-metallic rope member, the inner end of which extends through an aperture in said flotation collar and which also passes through at least one aperture formed in said closure member near the periphery thereof to function as a hinge for the closure member and to exert a closing force on the closure.

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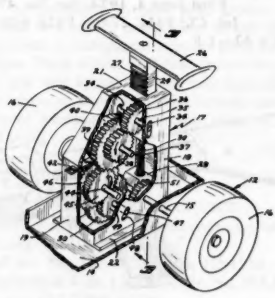
### 3,919,804
### TRAVELING TOY

Toyotaro Nakata, Yasuzuka Mibumachi, Japan, assignor to Tonka Corporation, Hopkins, Minn.

Filed Apr. 22, 1974, Ser. No. 462,788
Int. Cl.² A63H 17/00
U.S. Cl. 46—206 1 Claim



1. In a miniature wheeled toy vehicle adapted to be powered over a ground surface by a windable spring,
a. a chassis,
b. said chassis supported on an axle carrying ground wheels,
c. a mounting frame on the chassis,
d. a shaft journaled on the mounting frame parallel to the axle and carrying a spiral spring having one end fixed to the shaft and the other end fixed to the mounting frame,
e. a gear fixedly mounted on the axle,
f. an operating bar supported in the mounting frame in upright position for vertical sliding movement and having a rack of gear teeth spaced vertically therealong,
g. said bar having a cross handle at its upper end and a pin on its lower end slidably seated in a holder on the mounting frame with a spiral spring encircling the pin and held under compression between the bar and mounting frame to yieldably bias the operating bar toward a raised position,

h. a gear train of intermeshing gears connecting the rack to the axle gear and including gears fexed on the shaft carrying the spiral spring to transmit downward movement of the operating bar to store energy in the spiral spring when the bar is depressed and to transmit the energy in the spring to rotational movement of the axle when the bar is released, and

i. said gear train including a pinion which is journaled in slots to be movable between a non-intermeshing position with the axle gear when the operating bar is moving downwardly and a position in intermeshing engagement with the axle gear when the bar is moving upwardly.

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**3,919,805**

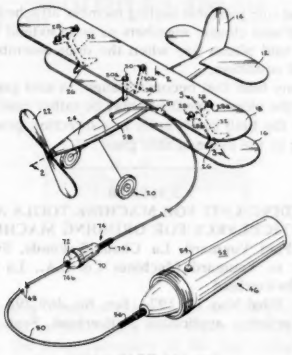
**MODEL AIRCRAFT**

**Victor Stanzel, Schulenburg, Tex. 78956**

**Filed Nov. 16, 1973, Ser. No. 416,593**

**Int. Cl.² A63H** *33/26*

**U.S. Cl. 46—243 AV** **5 Claims**



1. In a model aircraft of the type wherein a propeller is driven from a remote drive unit by an elongated flexible cable confined within a flexible tube, the improvement comprising: a secondary control knob slidably and rotatably mounted about said tube which may be selectively positioned to control the effective length of said drive cable and tube to thereby selectively control the radius of flight of said aircraft,

said secondary control knob including a flexible support at the forward end thereof to prevent sharp bends in said flexible cable and tube.

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**3,919,806**

**METHOD AND APPARATUS FOR USING ELECTRICAL CURRENT TO DESTROY GRASSES AND WEEDS**

**Ricks H. Pluenneke, Greenwood, and Willis G. Dykes, Vicksburg, both of Miss., assignors to Lasco, Inc., Greenwood, Miss.**

**Filed Nov. 1, 1974, Ser. No. 520,230**

**Int. Cl.² A01M** *21/00*

**U.S. Cl. 47—1.3** **18 Claims**

1. A machine for destroying weeds growing in and around crop rows, said machine comprising

a. a vehicle,

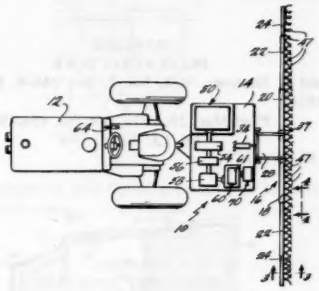
b. a source of high-voltage electricity mounted on and movable with said vehicle,

c. means for connecting said high-voltage source of electricity to ground, and

d. means for destroying all plants higher than a predetermined height in the crop rows and all plants around the crop rows, said means including

i. an electrically conductive generally horizontally disposed rod mounted on said vehicle and operatively connected to said source of high-voltage electricity and generally parallel to the ground, and

ii. means mounted on said rod for transferring electricity from said rod to weeds growing in and around said crop rows traversed by said rod, said means including a plurality of individual electrically conductive members, each member comprising a pair of spring leaves or the like deflectable by weeds engaged thereby, said members being adjacent to or overlapping each other in the horizontal direction to present in combination a continuous front along the length of said rod for destroying all plants in their path, and means for individually adjusting the spacing from the ground of each of said individual electrically conductive members, said members generally not being close enough to the ground to arc thereto.



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**3,919,807**

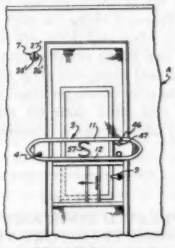
**DOORWAY SAFETY RAIL AND DOOR LOCK FOR VEHICLE LIVING UNITS**

**Charles H. Mefford, 2426 Standard No. C, San Pablo, Calif. 94506**

**Filed Sept. 13, 1974, Ser. No. 505,544**

**Int. Cl.² E06B** *3/68, 7/00*

**U.S. Cl. 49—56** **5 Claims**



1. A safety rail for a vehicle living unit having a door frame with first and second sides and a door hingedly mounted for pivotal movement outwardly comprising:

a. an elongated safety rail adapted for two way pivotal mounting on one side of the door frame on the inside of the living unit and having a first position spanning the door opening at about waist level and a second position clearing the door opening;

b. quick release means adapted for connection to said door frame for releasably holding said safety rail in said first generally horizontal position, having a pin preventing rotation in a plane parallel to the door frame and having a member preventing movement of said safety rail in a direction perpendicular to said door;

c. means adapted for connection to said door frame for releasably holding said safety rail in said second generally vertical position; and

d. pivot means adapted for mounting on said first side of said door frame for pivotally holding said safety rail having a member permitting movement of said rail in a plane parallel to said frame through an arc of at least 90° and another member further permitting limited pivotal movement of said rail generally perpendicular to the plane of said frame.

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**3,919,808**

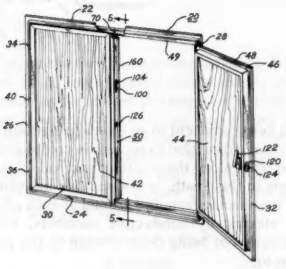
**DOOR STRUCTURE**

**Donald F. Simmons, R.R. No. 2, Box 360-9, Elkhart, Ind. 46514**

**Filed Mar. 29, 1974, Ser. No. 456,190**

**Int. Cl.² E05C** *7/04*

**U.S. Cl. 49—367** **9 Claims**




1. A door structure comprising a frame, a pair of doors hinged to said frame and opening from the center, a box member secured to the center edge of one of said doors and having an elongated channel of generally rectangular cross section and an elongated strip insertable in the edge of said box facing the other door, a latch means disposed in said box member and having a retainer and an upper and lower axially movable shaft for engaging a socket in the frame at the top and bottom parts thereof, guide means for said shafts disposed in said channel, and an operating mechanism in said retainer having a member interconnecting said shafts and having an operating handle disposed along the edge of said box member between said doors when said doors are in closed position for operating both of said shafts simultaneously, said latch means being mounted on said elongated strip and being inserted in said channel as said strip closes the open side of said channel, and a means on said other door for retaining it in closed position while said latch means is retaining said other door in closed position.

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**3,919,809**

**POWER OPERATED DOOR ASSEMBLIES FOR PASSENGER TRANSPORT VEHICLES**

**Ernest Haughton, Ormskirk, England, assignor to Merseyside Passenger Transport Executive, Liverpool, England**

**Filed Mar. 22, 1974, Ser. No. 454,029**

**Int. Cl.² E06B** *7/16*

**U.S. Cl. 49—368** **7 Claims**

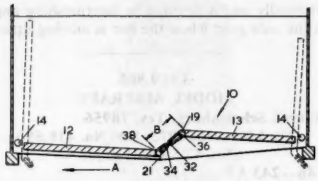
1. A door assembly adapted to be mounted on the side of a public transport vehicle having a front, a rear and said door assembly being characterized by:

a. two cooperating closure members composed of a first closure member and a second closure member that is disposed substantially entirely to the rear of said first closure member,

b. each of said closure members having a substantially vertical closing edge,

c. means for varying the horizontal distance between said closing edges so that the door assembly can be changed from a closed condition to an open condition,

d. said closure members being mounted so that when the door assembly is in its closed condition said closing edges approach each other most closely, but leave between them a planar gap that extends rearwardly and inwardly with respect to the closing edge of said first closure member, and




e. at least one yieldable sealing member attached to at least one of said closure members so as to extend across and close said planar gap when the door assembly is in its closed condition,

whereby any limb that becomes caught in said gap upon the closing of the closure members may be rather easily removed by pulling the limb backwardly in a direction generally perpendicular to the plane of said gap.

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**3,919,810**

**SLIDING UNIT FOR MACHINE TOOLS AND PARTICULARLY FOR GRINDING MACHINES**

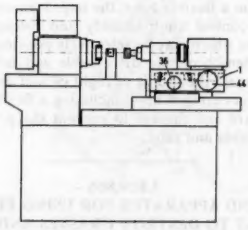
**Bertrand Paul Voumard, La Chaux-de-Fonds, Switzerland, assignor to Voumard Machines Co. S.A., La Chaux-de-Fonds, Switzerland**

**Filed May 14, 1974, Ser. No. 469,793**

**Claims priority, application Switzerland, Sept. 17, 1973, 13293/73**

**Int. Cl.² B24B** *51/00*

**U.S. Cl. 51—165.87** **9 Claims**




1. A sliding unit for a grinding machine comprising a compact block table to be placed on a base table of a grinding machine for carrying on a portion thereof an operating arrangement of the grinding machine, and a slide drive mechanism positioned within said block table to cause said arrangement to carry out all the functional movements of the grinding machine in the direction of slide of said slide mechanism, said mechanism comprising a precision electric motor arrangement for controlling the coarse-feed and plunge-cut transverse displacements of the grinding machine, said coarse-feed and plunge-cut displacement arrangement comprising a step-by-step electric motor whose shaft is perpendicular to the direction of slide, a micrometric stepped-down device and a lever which steps down without play the movement of said micrometric device and modifies the direction of displacement by 90° and permits, in an engagement position, the defining of the plunge-cut with a precision on the order of a micron, said

lever comprising two rollers on a raceway, whose axes are located, with respect to the pivot axis of said lever, 90° apart from each other and at distances apart corresponding to the stepped-down ratio of said lever, the roller located furthest from the pivot axis resting against the flat head of a sleeve comprised by said micrometric device, while the flat head of a piston rod which drives the portion rests, in position of engagement of said hydraulic arrangement, against the roller whose axis is closest to the axis of pivot of the lever, and said last-mentioned roller being supported in the manner of an eccentric on a raceway passing around the pivot axis of said lever.

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**3,919,811**

## GRINDING WHEEL FOR FORMING A FACET ON THE PERIPHERY OF AN EYEGLASS LENS

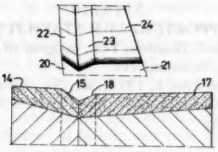
**Lars Hedelin, Skarnasvagen 5, 182 63 Djursholm, Sweden**

**Filed Apr. 25, 1974, Ser. No. 463,997**

**Claims priority, application Sweden, Apr. 25, 1973, 7305793**

**Int. Cl.² B24B 9/14; B24D 7/18**

**U.S. Cl. 51—204** **3 Claims**




1. A grinding wheel for grinding around the periphery of a relatively thick eyeglass lens a facet which is axially located at or near to the front curvature of the lens comprising two grinding tracks for grinding the facet, one of said tracks having a higher grinding capacity than the other track, said lens and said grinding track being mounted floatingly in axial direction relative to each other, said grinding tracks being situated on the periphery of at least one grinding wheel, said grinding wheel being profiled to generate at least one of the facet surfaces and that said wheel has a first slightly sloping peripheral conical surface which continues to a second sloping surface, said wheel having a groove between said sloping surfaces, said first sloping surface being capable of guiding the lens into said groove for forming the facet.

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**3,919,812**

## JOINDURE OF MODULES IN PREFABRICATED BUILDINGS

**Cornelis van der Lely, 7, Brüschenrain, Zug, and Hendricus Jacobus Cornelis Nieuwenhoven, Hirssattelweg, 6340 Baar, both of Switzerland**

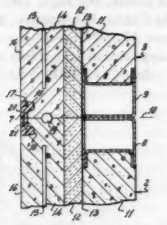
**Filed Nov. 6, 1973, Ser. No. 413,374**

**Claims priority, application Netherlands, Nov. 7, 1972, 7215005**

**Int. Cl.² E04B 2/10**

**U.S. Cl. 52—79** **33 Claims**

33. In a building, a pair of prefabricated box-shaped space enclosing sections which are adjoined and connected in a substantially contacting side-to-side relationship, the area of the junction between said pair of said sections being completely coincident with a vertically disposed plane, vertical beams in each said section, each said beam being connected to part of a wall of each said section and being situated behind an outer wall part of each said section, said outer wall parts extending perpendicularly away from said plane, said outer wall parts being symmetrical in the region of said plane, said outer wall parts together defining a recess, said recess being filled with a finishing material and a support being provided



which is arranged in said finishing material to support said material in said recess.

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**3,919,813**

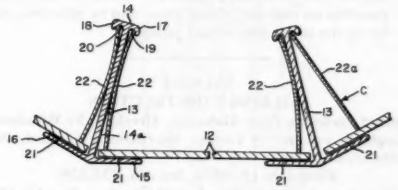
## BUILDING STRUCTURE

**Lucian J. Beindorf, M.P.O. Box 351, Springfield, Mo. 65801**

**Filed Nov. 17, 1972, Ser. No. 307,736**

**Int. Cl.² L04B 1/32**

**U.S. Cl. 52—80** **16 Claims**



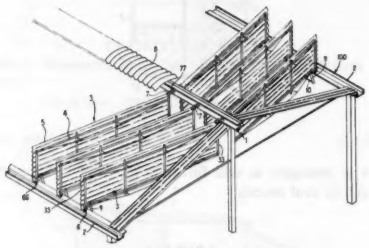

1. A building structure comprising a plurality of inwardly arched structural members in the form of generally T-shaped girders each having a transverse web and a pair of flanges extending outwardly from one end thereof, similarly arched panels placed against the inner surfaces of said flanges to form a generally hemispherical configuration, locking members extending outwardly from the other end of said webs and forming channels therewith, and locking means securing said panels to said structural members, one end of said locking means placed adjacent the inner surface of a panel and the other end being inserted within one of said channels, said structure including a further member at its upper surface at which said structural members are secured, said further member providing open access to the interior of said structure.

12. The method of assembling a generally hemispheric building structure comprising the steps of erecting a plurality of inwardly arched structural members in the form of generally T-shaped girders each having a transverse web and a pair of flanges extending outwardly from one end thereof and locking members extending outwardly from the other end thereof and forming channels therewith, placing similarly arched panels against the inner surfaces of said flanges, placing locking means against said panels and said structural members to provide a unitary structure by applying one end of said locking means adjacent the inner surface of said panels and inserting the other end of said locking means within one of said channels, and applying pressure to said locking means to lock said panels to said girders.

## 3,919,814
## OPENABLE PANEL STRUCTURE SUITABLE FOR USE EITHER AS ROOFING OR AS A CURTAINWALL FOR BUILDINGS

**Achille Beretta, Via Dante, Barzago, Italy (22061), and Giovanni Crippa, Via Cantu, Casatenovo, Italy (22064)**

**Filed June 17, 1974, Ser. No. 480,267**
**Claims priority, application Italy, July 3, 1973, 46862**
**Int. Cl.² E04B 7/02**
**U.S. Cl. 52—90** **8 Claims**



**1.** Panel structure comprising:
a frame having two parallel sides defining a plane, and
a plurality of panels supported by said frame, each panel being mounted to swing about an individual axis diagonal to that panel between a closed position in which said panels lie parallel to each other in the plane of said frame and an open position in which two adjacent sides of each panel lie on one side of said plane and its other two sides lie on the other side of said plane.

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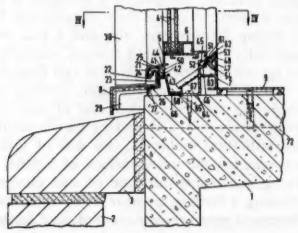
## 3,919,815
## BUILDING CONSTRUCTION

**Leonard Frederick Peter Alabaster, Alresford, Nr Winchester, England, assignor to Conder International Limited, Winchester, England**

**Filed Jan. 15, 1974, Ser. No. 433,529**
**Claims priority, application United Kingdom, Jan. 15, 1973, 2126/73; Mar. 6, 1973, 10836/73**
**Int. Cl.² E06B 7/14, 3/62**
**U.S. Cl. 52—97** **8 Claims**



**1.** A window construction for a building, comprising:
a window surround having two sides, a sill and a head, at least one of said sides, sill and head having a generally rearward-facing sealing surface and a generally forward-facing jamming surface spaced to the rear of said sealing surface;
a window frame in said window surround, said window frame having two sides, a bottom and a top and at least one of said sides, bottom and top having a generally forward-facing sealing surface adjacent and to the rear of said window surround sealing surface and a generally rearward-facing jamming surface spaced to the rear of said window frame sealing surface and adjacent and in front of said window surround jamming surface;
a resilient seal between said window surround sealing surface and said window frame sealing surface; and
a strip-like jamming member inserted between said window surround jamming surface and said window frame jamming surface and thrusting said window frame sealing surface against said window surround sealing surface by way of said resilient seal, said jamming member, as seen in vertical cross-section in position at the bottom of and securing said frame, having a front surface for engagement with said window frame jamming surface, an upper rear portion and a lower rear portion, said upper and lower rear portions having upper and lower rear surfaces for engagement with said window surround jamming surface, the upper and lower rear portions defining a recess therebetween, said recess having a generally concave surface the depth of said recess being such as to define a substantial space between the window surround jamming surface and said concave surface to facilitate insertion of the lower rear portion of the jamming member between the window frame jamming surface and the window surround jamming surface.

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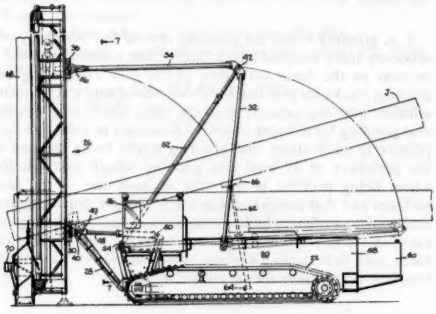
## 3,919,816
## MAST SUPPORTING ADJUSTABILITY DEVICE

**Eberhard V. Ranft, Houston, Tex., assignor to Raymond International, Inc., Houston, Tex.**

**Filed May 1, 1974, Ser. No. 466,076**
**Int. Cl.² E04H 12/34; E21C 9/00**
**U.S. Cl. 52—116** **15 Claims**

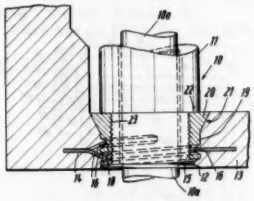


**1.** A mechanism for adjustably supporting a mast from a base member, said mechanism comprising a first mounting means pivotally interconnecting a lower point on said mast in front of a first location of said base member near one edge thereof, a rear brace connected at one end to extend up from a second location on said base member behind said first location, an upper brace freely pivotally connected between an upper point on said mast and the other end of said rear brace and extendable actuating means for causing forward and rearward movement of said upper brace and pivotal movement of said rear brace with respect to said base, said actuating means being pivotally fastened to said base member between said first and second locations and connected to at least one of said upper and rear braces, the length of said upper and rear braces and the extensibility of said actuating means being sufficient to permit the mast to be retracted to a horizontal transport position on top of said base.

## 3,919,817
## FLOOR JACK ANCHORING ARRANGEMENT FOR GARAGE LIFTS

**Karl Plotner, Unter den Linden 31, 282 Bremen 70, Germany**

**Filed June 26, 1974, Ser. No. 483,349**
**Claims priority, application Germany, June 27, 1973, 2332658**
**Int. Cl.[2] B66F** *11/00;* **E04D** *15/00;* **E04H** *12/34*
**U.S. Cl. 52—126** **11 Claims**



1. In an apparatus for raising and lowering a roomsized building unit, particularly a prefabricated garage made from reinforced concrete, with jacks anchored in openings in the floor of the unit, the improvement comprising:

a. a plurality of anchor plates embedded in the concrete floor and individually surrounding each opening, each anchor plate being substantially planar and having an edge projecting into its associated opening,

b. a plurality of anchor members individually secured to each jack, each anchor member having a coarse pitch thread configured to fit into and mate with each opening and to engage a projecting anchor plate by turning the jack.

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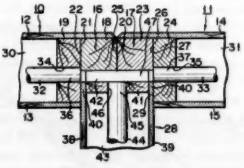
## 3,919,818
## JOINT STRUCTURE FOR PANELS IN PREFABRICATED HOUSING

**Yoshiya Kato, Hachioji, Japan, assignor to Misawa Homes Institute of Research & Development, Tokyo, Japan**

**Filed May 21, 1974, Ser. No. 471,843**
**Claims priority, application Japan, May 24, 1973, 48-60959; May 24, 1973, 48-60960**
**Int. Cl.[2] E04B** *5/48;* **E04F** *17/00*
**U.S. Cl. 52—220** **5 Claims**



1. A joint structure for panels in prefabricated housing comprising:

a. at least one first vertical panel comprising a pair of vertical plates spaced in parallel with each other, vertical frame members having a rectangular cross section, disposed at respective side ends of the vertical plates and effecting connection between the vertical plates, horizontally extending pipes for electric wires disposed in the first wall panel and each having ends passing through the respective frame members, and columnar joint members each fixed to the outer surface of the corresponding frame member and the inner surface of one of the vertical plates and extending from the inner surface to the substantially central line of the corresponding frame member so as to form an L-shaped recess with the respective frame members;

b. at least one second vertical wall panel disposed perpendicular to the first vertical wall panel and comprising a pair of second vertical plates spaced in parallel with each other, at least one vertical side frame disposed at a side end thereof and effecting connection between the second vertical plates, said side frame having a shape complementary to said L-shaped recess between the corresponding joint member and frame member of the first vertical wall panel, horizontally extending pipes for electric wires each having an end passing through the vertical side frame at the central line thereof; and

c. horizontally extending notch-shaped connecting chambers formed in the side frame of the second wall panel and the frame member of the first wall panel adjacent thereto for communication between the pipes of the first and second wall panels at the same level.

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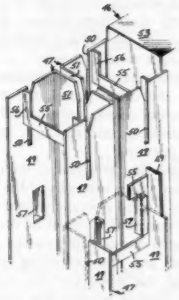
## 3,919,819
## SELF LOCKING PANEL CONNECTOR

**Wayne H. Oliver, 1305 Spring Valley Road North, Minneapolis, Minn. 55422**

**Continuation-in-part of Ser. No. 330,057, Feb. 6, 1973, abandoned. This application Oct. 4, 1974, Ser. No. 512,356**
**Int. Cl.[2] E04B** *1/08;* **E04C** *1/10*
**U.S. Cl. 52—233** **8 Claims**

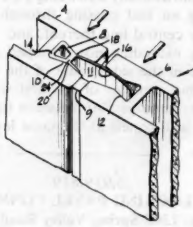


1. In combination, a plurality of generally rectangular wall panels each having spaced parallel side walls, opposed top and bottom surfaces, opposite vertically extended ends, and self locking connector elements at said opposite ends; each of said connector elements extending substantially the full vertical length of its respective panel and comprising laterally spaced generally flat side wall portions and a generally flat transverse wall portion connecting said side wall portions; said side wall portions projecting outwardly from the panel ends in planes parallel to the planes of said panel side walls and rigidly connected to the panel side walls; said side wall portions and transverse wall portions of each connector element cooperating with its respective panel to define an open ended passageway and having opposite ends adjacent respective ones of said top and bottom surfaces of the panel; said transverse wall portion and at least one of said side wall portions of each connector element each having a pair of aligned longitudinal slots extending from opposite ends of their respective connector element longitudinally of the passageway defined thereby; each slot having a bottom disposed in spaced relationship to the bottom of the slot aligned therewith; the slots of the transverse wall portion and one side wall portion of each connector element being arranged to receive the transverse wall portion and one of the side wall portions of another connector element beyond the bottom of the slots thereof when said panels are moved into interlocking relationship at generally right angles to each other.

## 3,919,820
## WALL STRUCTURE AND DEVICE FOR SEALING THEREOF

**Robert Franklin Green, Morrison, Colo., assignor to Johns-Manville Corporation, Denver, Colo.**

**Filed Dec. 13, 1973, Ser. No. 424,266**
**Int. Cl.² E04B** *1/68*
**U.S. Cl. 52—396** **6 Claims**



**1.** A wall structure incorporating the rain screen principle and suitable for use in weather exposed locations, which comprises:

a first wall panel;

a second wall panel in edge-to-edge adjacent relationship to said first wall panel, substantially coplanar therewith, and spaced slightly therefrom, whereby a gap having an outward portion and an inward portion is formed between the facing edges of said panels;

each of said panels having a longitudinal groove in the edge adjacent to the other panel, the two grooves thereby being in facing edges, substantially opposed to each other, and dividing said gap into its respective outward and inward portions;

an air sealing member attached to the inner portion of each of the opposed edges inwardly of the grooves therein, and spanning the inward portion of said gap therebetween;

a baffle device comprising retention means for securing said baffle device in one of said grooves and a flexible screen spanning said gap and extending into the other of said grooves; said baffle device also comprising means for urging said flexible screen into contact with the outer sides of both of said grooves; and no portion of said baffle device substantially extending into that portion of said gap which lies outwardly of said grooves; and

said flexible screen and air sealing member cooperating with said grooves to form a pressure equalization chamber, whereby a substantially weathertight seal is created across said gap and the penetration of moisture to the interior of said wall structure is prevented.

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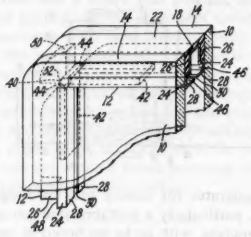
## 3,919,821
## MULTIPANE GLAZING UNIT

**Guenther Goetz, Rodheim, Germany, assignor to Bostik G.m.b.H., Oberursel, Germany**

**Filed July 25, 1973, Ser. No. 382,569**
**Claims priority, application Germany, July 27, 1972, 2237018**
**Int. Cl.² E06B** *3/24*
**U.S. Cl. 52—398** **3 Claims**

**1.** In a multipane insulating glazing unit comprising an assembly of spaced parallel panes of glass having edges and corners, a plurality of integral spacer members of substantially uniform width between said panes defining an enclosed central space between said panes, said spacer members having hollow interiors defined by walls of substantially impervious material comprising inner walls with openings for communication between said central space and the interiors of said spacer members, outer walls and side walls including surface portions for determining the spacing of said panes, said spacer members extending generally parallel to and with their outer walls spaced inwardly of the edges of said panes to form channels along the periphery of said assembly and said spacer members terminating in ends adjacent ends of other spacer members at corners of said glazing unit, and bonding and sealing material in said channels extending from pane to pane exteriorly of said outer walls of said spacers bonding together said panes and spacer members and sealing said assembly against passage of air to or from said central space, the improvement which comprises that said outer walls and portions of said side walls are bent toward said inner walls at the ends of said spacer members to constitute integral impervious closure means for the ends of said spacer members to restrict any openings at said ends to locations inwardly of said outer walls, that corner pieces comprising angularly extending arms are disposed with said arms in said restricted openings at ends of said spacer members to connect said spacer members at corners of said glazing unit and at each of said corners a body of sealant between the outermost edge of said openings and the outer air having a thickness a plurality of times the thickness of sealant between said outer walls and the outer air in the major portions of the length of said spacers.



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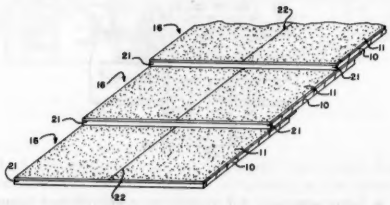
## 3,919,822
## ROOFING PANEL AND ASSEMBLY AND METHOD

**Otis M. Martin, San Jose; John K. Kough, Morgan Hill, and Silas N. Miller, Saratoga, all of Calif., assignors to Ditz-Crane, San Francisco, Calif.**

**Filed May 17, 1974, Ser. No. 470,996**
**Int. Cl.² E04D** *1/20, 3/18*
**U.S. Cl. 52—540** **3 Claims**



**1.** An assembly of panels forming a roof or siding for the outer side of a building structure, each of the panels comprising a base strip of substantial thickness and strength adapted to be secured to a supporting structure to form structural sheathing, and a planar strip of waterproof surfacing composition having an upper margin of the same secured to the inner side of the base strip along the lower margin of the same, one panel in the assembly having the lower margin of its base strip overlapping the upper margin of the base strip of the next lower panel, with the upper margin of the surfacing composition interposed between the overlapping margins of the base strips, and with the surfacing composition of said one panel overlying and covering and secured to the outer side of the

next lower base strip and terminating at the lower edge of the same, the upper surfaces of the composition extending between the lower horizontal edges of the base strips being exposed to the weather and the contiguous lower horizontal edges of the base and composition strips forming horizontally extending shadow lines.

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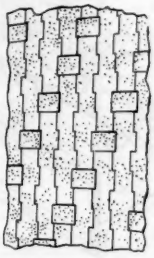
**3,919,823**

## ROOF SHINGLE

**Robert C. Bradley, Downers Grove, Ill., assignor to Lloyd A. Fry Roofing Company, Summit, Ill.**

**Filed Apr. 3, 1974, Ser. No. 457,644**
**Int. Cl.[2] E04D** *1/26, 1/10*
**U.S. Cl. 52—557** **5 Claims**



**1.** A roof deck covering composed of a plurality of asphaltic composition shingles arranged in a plurality of courses, each of said shingles being of generally rectangular outline, and including three similar sections, each section having three butt edge steps arranged in a repeat pattern with the step at the left-hand side of the section having the maximum width in the direction of the width of the shingle, and each of the next two integral succeeding steps in the section being progressively reduced slightly in width while being of substantially the same length as the step at the left-hand side of the section, each of said courses including a first shingle disposed at the left-hand edge of the roof deck and a plurality of succeeding shingles in linear alignment, each of said succeeding shingles having a single knife-edge cut substantially parallel to and spaced from the left-hand edge of the shingle and extending upwardly from the butt edge thereof coincident with the right-hand edge of the step of maximum width, a portion of each succeeding shingle between said left-hand edge and the cut overlapping a corresponding right-hand portion of a preceding shingle in the same course, with the left-hand edge of the succeeding shingle defining the cut being disposed in abutment with the right-hand edge of a preceding shingle and in the same plane, the overlapping portion being disposed in a superposed plane and providing an additional dimension, creating a shadow effect, said shingle cut being the only incision in the body of said shingle of substantially rectangular outline for permitting the displacement of the left-hand butt edge step of the shingle in a different plane, and the free edges of the three butt edge steps in each of the three sections being in substantial parallelism to the opposite rectilinear edge of the shingle.

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**3,919,824**

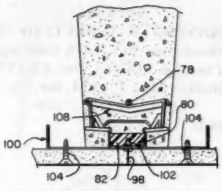
## JOIST, STRUCTURAL ELEMENT AND DEVICES USED IN MAKING SAME

**George Bradley Davis, Jr., P.O. Box 1096, Boulder, Colo. 80302**

**Division of Ser. No. 256,257, May 24, 1972, Pat. No. 3,813,834, which is a continuation-in-part of Ser. No. 41,426, May 28, 1970, abandoned. This application Sept. 24, 1973, Ser. No. 400,381**
**Int. Cl.[2] E04B** *1/41;* **E04C** *3/18*
**U.S. Cl. 52—689** **12 Claims**

**1.** A single piece plastic member for positioning an object in a hollow member, said plastic member comprising:

a. an elongate support portion the upper surface of which is concave in configuration;
b. a pair of L-shaped portions
  i. each L-shaped portion including a pair of arms,
  ii. each L-shaped portion depending from a corresponding one of the ends of said support portions and having one of said arms disposed parallel with said support portion,
  iii. each L-shaped portion being constructed for limited pivotal movement relative to said support portion in a plane in which is disposed said support portion and said L-shaped portions,
  iv. each of the arms of said L-shaped portion that are integrally attached to said support portion being convergently disposed one to the other in a direction proceeding from said support portion toward the arms disposed generally parallel with said support portion,




  v. the free ends of said arms, that are disposed generally parallel with said support portion, lying generally in a common plane and spaced apart one from the other, said free ends being constructed for engaging a portion of the object,
  vi. each free end of said arms, that are disposed generally parallel with said support portion, including a portion disposed generally normal to the longitudinal axis of its corresponding arm and also being disposed within said common plane, and
  vii. each L-shaped portion including stiffening means for controlling the overall stiffness thereof, said stiffening means including a diagonally disposed member interconnecting the arms of each L-shaped portion; and
c. means interconnecting a portion adjacent the free ends of each arm disposed generally parallel with said support portion thereby preventing undesirable entanglement of one plastic member with another when packed in a container.

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**3,919,825**

## METHOD FOR ASSEMBLING A PREFORMED FLOOR AND ROOF STRUCTURE

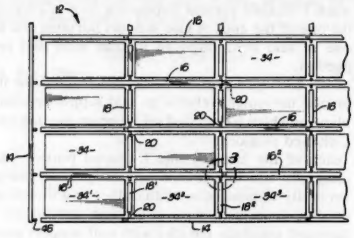
**Edward A. Smith, 6641 W. 6th St., Los Angeles, Calif. 90048, and Robert L. Day, 1518 Grismer St., Burbank, Calif. 91504**

**Division of Ser. No. 381,529, July 23, 1973, Pat. No. 3,881,286. This application Nov. 18, 1974, Ser. No. 524,972**
**Int. Cl.[2] E04B** *2/56*
**U.S. Cl. 52—741** **2 Claims**

**1.** The process of on site construction of a building section utilizing a series of structural rails of tubular configuration and a set of panels, which comprises:

a. progressively connecting the structural rails into a rectangular grid by the aid of connector structures telescopically received in the tubular portions of the rails;

b. inserting panels into each rectangle before the rectangle is closed by a rail;



c. progressively closing rectangular elements of the grid and thereby interlocking said panels.

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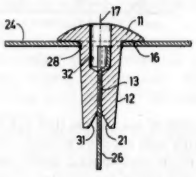
**3,919,826**

**DEVICE FOR JOINING TWO SHEETS OF SHEET METAL**

**Georg Mez, Gartenstrasse 30A, 7416 Gonningen, Germany**

**Continuation of Ser. No. 314,465, Dec. 12, 1972, abandoned.**
**This application May 3, 1974, Ser. No. 466,907**
**Int. Cl.[2] F16B *17/00***
**U.S. Cl. 52—758 D** **10 Claims**



1. A sheet metal connection arrangement comprising two sheets of sheet metal positioned at an angle to each other, a connecting element comprising a shank passing through a first of said sheets, said connecting element having a longitudinal gap in the symmetrical axis thereof for receiving the other of said sheets whereby the leading edge of said other sheet contacts said first sheet and a head contacting said first of said sheets at least indirectly, said connecting element having a bore leading from said head into said longitudinal gap, of a diameter larger than the width of said gap, said other of said sheets having an area extending within said bore with its leading edge close to said first sheet, said extending area being offset along its entire extending height in a direction substantially normal to said bore towards that wall of said bore which is arranged beyond the symmetrical axis of said longitudinal gap, said area being position close to said wall and maintaining practically uninterrupted integration along its entire height with said other of said sheets.

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**3,919,827**

**METHOD AND APPARATUS FOR PACKAGING LARGE SIZE BAGS IN CARTONS**

**Richard T. Larson, Rogers, Ark., and William F. Leatherbury, Country Club Hills, Ill., assignors to Union Carbide Corporation, New York, N.Y.**

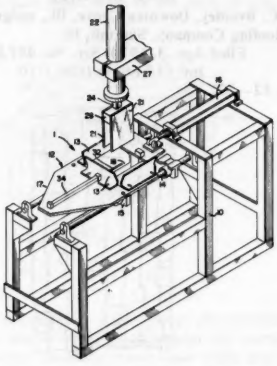
**Filed Nov. 26, 1974, Ser. No. 527,429**
**Int. Cl.[2] B65B *63/04***
**U.S. Cl. 53—21 FW** **14 Claims**

10. A method for folding and packaging into a small size carton a plurality of large size flat, flexible sheets which comprises

a. assembling and supporting a stack of flat, flexible sheets in a carriage having a bottom surface, said bottom surface having an opening leading to a forming throat;

b. placing a mandrel across the opening leading to the forming throat;

c. advancing and folding said stack of sheets about said mandrel partly into said throat by blades spaced between said mandrel and walls defining said throat to a first



forming station to thereby form the stack into a plurality of tight deep folds extending substantially transverse to the longitudinal axis of the stack;

d. partly withdrawing the blades from the throat to a second forming station and completely withdrawing the mandrel from the folded stack; and

e. advancing said blades from said second station into the folded stack sufficiently to project said stack through said throat into a carton juxtaposed with said throat.

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**3,919,828**

**PICKLE PACKING MACHINE**

**Roger P. Zellman, Chaska, Minn., assignor to M. A. Gedney Company, Chaska, Minn.**

**Continuation of Ser. No. 277,922, Aug. 4, 1972, abandoned.**
**This application May 10, 1974, Ser. No. 468,809**
**Int. Cl.[2] B65B *1/24***
**U.S. Cl. 53—124 B** **8 Claims**

1. An improved pickle packing apparatus for pressing pickles into a container and retaining the same therein sufficiently long so that said pickles remain wedged in said container below the top edge of said container without external retaining means after said pressing force is removed, said apparatus comprising:

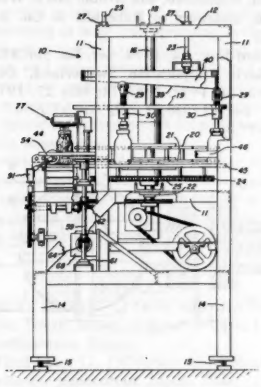
a vertically adjustable cam surface arranged in a generally horizontally disposed closed loop;

a plurality of plunger assemblies moveable in a closed loop path below said cam surface, each having a first portion adapted for limited movement into a container and a second portion moveable with said first portion and adapted for engagement with said cam surface, said cam surface and each of said plunger assemblies being associated with each other such that movement of said plunger assembly in said closed loop path and engagement between said second portion and said cam surface causes vertical movement of said first portion into and out of said container, the shape of said cam surface and the relationship between said cam surface and said plurality of plunger assemblies being such that during movement of said plunger assemblies, said first portion is moved into said container in a pressing action and retained in such pressing action sufficiently long so that the pickles remain

wedged in said container below the upper edge thereof without external retaining means after such pressing force is removed,

means for vertically adjusting said cam surface to a position in which the relationship between the vertically adjusted position of said cam surface and said plurality of plunger assemblies is such that at least two of said plunger assemblies are engaged in said pressing action simultaneously and such that each of said plunger assemblies is engaged in said pressing action throughout in excess of one-half of its movement along said closed loop path; and

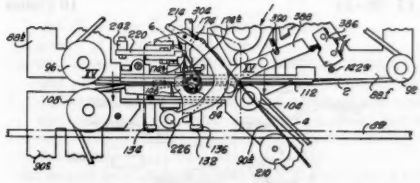
alignment means properly aligning said containers with said plunger assemblies to enable said first portion of said plunger assembly to reciprocate into and out of said container.



## 3,919,829
## APPARATUS FOR TYING PACKAGES AND WRAPPING MATERIALS

**Leonard W. Burford, P. O. Box 388, Maysville, Okla. 73057, and Charles E. Burford, Suite 1414, Frito Lay Tower, Dallas, Tex. 75235**

**Filed May 26, 1971, Ser. No. 147,143**
**Int. Cl.[2] B65B** *51/08*
**U.S. Cl. 53—135** **10 Claims**

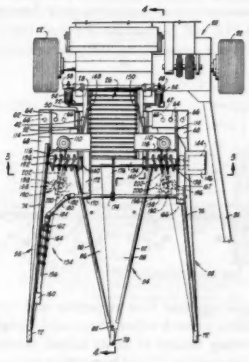


**1.** Package tying apparatus comprising, a general frame; friction means on the frame to grip a portion of the package; spaced guide means on the frame, said guide means having a slot extending longitudinally therebetween; package stop means on the frame; means to move the package stop means transversely of said slot to a first position between the friction means and the guide means; means to move the friction means relative to the stop means to draw a portion of a package around the package stop to form a gathered neck, said friction means being adapted to draw a portion of the package into pressure contact with said guide means; means on the frame to secure the gathered neck; and drive means secured between the frame and the stop means to move the stop means to a second position wherein the stop means is disengaged from a package moving along said slot.

## 3,919,830
## ROW CROP ATTACHMENT FOR FORAGE HARVESTERS

**Jerome J. Gerber, Murdock, Kans. 67111**

**Filed Nov. 26, 1973, Ser. No. 419,138**
**Int. Cl.[2] A01D** *45/02*
**U.S. Cl. 56—13.6** **11 Claims**



**8.** In a row crop attachment for a forage harvester having a means to gather crop stalks and a forwardly extending crop stalk guide member, that improvement comprising stalk moving means having,

a. a powered rotatable stalk moving member mounted on and disposed over an upper portion of said forwardly extending stalk guide member to in operation contact crop stalks and guide same into said means to gather crop stalks,

b. powering means mounted with said row crop attachment and said stalk moving member to rotate said stalk moving member, and

c. a transverse knock-down roller means rotatably mounted on said stalk guide member in position generally transverse thereto, said knock down roller means being connected to said stalk moving member to rotate therewith.

## 3,919,831
## CROP HARVESTING MACHINE CONVERTIBLE BETWEEN FIELD OPERATING AND ROAD TRANSPORTING ORIENTATIONS

**Lawrence M. Halls, and Shaun A. Seymour, both of New Holland, Pa., assignors to Sperry Rand Corporation, New Holland, Pa.**

**Filed Jan. 24, 1975, Ser. No. 544,029**
**Int. Cl.[2] A01D** *75/22*
**U.S. Cl. 56—228** **31 Claims**

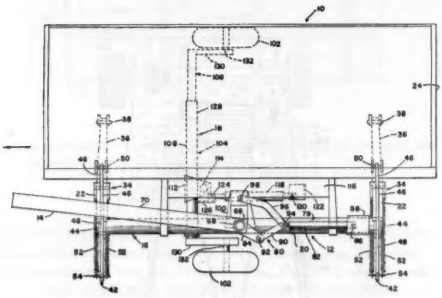
**1.** In a crop harvesting machine movable in a forward direction across a field and being of the type which includes an elongated crop material harvesting means, improved apparatus for facilitating conversion of said harvesting means from field operating to road transporting orientations which comprises:

first structure supporting said harvesting means, said first structure and said harvesting means being pivotal in relation to each other about a generally upright axis;

second structure supporting said first structure and being rotatable in relation thereto about a generally horizontal axis;

rotatable spaced apart ground wheels mounted to and supporting said second structure at locations similarly offset from said horizontal axis;

means for rotating said second structure and ground wheels relative to said first structure so as to effect relative movement between said wheels and said first structure and thereby move said harvesting means relative to said wheels and the field between a lowered position in which said harvesting means is disposed adjacent the field and a raised position in which said harvesting means is disposed remote from the field; and



means for pivoting said first structure and said harvesting means relative to each other about said upright axis, when said harvesting means is at its raised position, so as to facilitate conversion of said harvesting means from a field operating orientation in which said harvesting means axially extends generally transverse to said forward direction of machine movement across the field to a road transporting orientation in which said harvesting means axially extends generally parallel to said forward direction of machine movement across the field.

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**3,919,832**

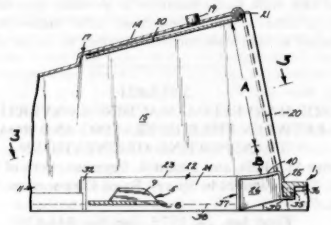
**MOWER AND DISCHARGE APPARATUS THEREFOR**

**Herman P. Christopherson, Burnsville, Minn., assignor to The Toro Company, Bloomington, Minn.**

**Filed Aug. 2, 1974, Ser. No. 494,169**

**Int. Cl.[2] A01D** *35/26*

**U.S. Cl. 56—320.2** **5 Claims**



**3.** In a rotary lawn mower including housing means and a cutting blade disposed in said housing means for rotation on a normally generally vertical axis, said housing means including a top wall and a circumferentially extending skirt depending from said top wall, said top wall having a portion extending generally tangentially relative to said skirt and angularly upwardly to provide top and side wall portions of a discharge chute for grass clippings; an insert element, and mounting means for mounting said insert element in the housing in downwardly spaced relationship to the top wall portion of said discharge chute, said insert element having a substantially vertical sidewall surface cooperating with said skirt to define a generally cylindrical inner wall surface radially outwardly of the path of rotation of said blade and extending upwardly from the plane of the blade, said insert element having a normally generally horizontal wall defining a bottom wall surface of said discharge chute.

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**3,919,833**

**FRICTION FALSE-TWIST DEVICE**

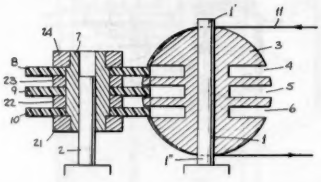
**Lajos Horvath, Wallisellen, and Arnold Steck, Wattwil, both of Switzerland, assignors to Heberlein & Co. AG, Wattwil, Switzerland**

**Filed Sept. 24, 1974, Ser. No. 508,832**

**Claims priority, application Switzerland, Oct. 1, 1973, 13760/73; Feb. 14, 1974, 2083/74; May 27, 1974, 7211/74**

**Int. Cl.[2] D01H** *7/92*; **D02G** *1/04*

**U.S. Cl. 57—77.4** **38 Claims**



**1.** Friction false-twist device for textile yarns, comprising two parallel rotation shafts each supporting a friction element, the circumferences of which mutually, partially overlap, characterized by a main friction element formed with at least one yarn contact surface vaulted on all sides and with at least one annular groove and a secondary friction element formed with at least one circular disc, the rim of which mates with the annular groove of the main friction element, and guiding means for feeding and withdrawing the yarn transversely with respect to the rotation axis of the main friction element.

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**3,919,834**

**MEMORY WATCH**

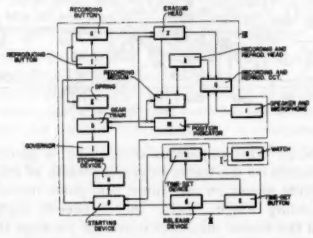
**Tomomi Murakami, Higashimurayama, and Akira Tsuzuki, Tokyo, both of Japan, assignors to Citizen Watch Co., Ltd., Tokyo, Japan**

**Filed Apr. 2, 1973, Ser. No. 347,347**

**Claims priority, application Japan, Feb. 24, 1973, 48-34123; Feb. 24, 1973, 48-58961; Feb. 24, 1973, 48-58962; Feb. 24, 1973, 48-22335**

**Int. Cl.[2] G04B** *21/08*; **G04C** *21/12*, *3/00*

**U.S. Cl. 58—14** **10 Claims**



**1.** In a timepiece, in combination:

a clockwork;

electro-acoustic transducer means having a recording mode for registering a voice message on a sound record and a reproducing mode for playing back a message so registered;

a carrier for said sound record juxtaposed with said transducer means for coaction therewith;

switchover means having a first and a second operating position for placing said transducer means in said reproducing and recording modes, respectively;

drive means for relatively displacing said carrier and said transducer means during operating cycles of predetermined duration in both said recording and reproducing modes, said drive means including mechanical energy-storing means prestressable to accumulate enough energy for performing at least one operating cycle;

presettable start means controlled by said clockwork for actuating said drive means at a selected time, upon a prestressing of said energy-storing means, for playing back a message registered on said sound record;

manually operable loading means for prestressing said energy-storing means; and

blocking means controlled by said loading means for preventing a displacement of said switchover means into said second operating position upon a failure to prestress said energy- storing means to an energy level sufficient to perform a reproducing cycle following a recording cycle.

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## 3,919,835
## ELECTRONIC CLOCK APPARATUS

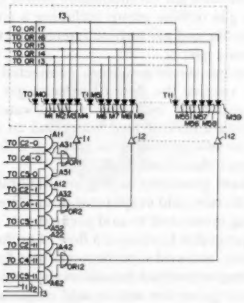
**Toshio Kashio, Tokyo, Japan, assignor to Casio Computer Co., Ltd., Higashiyamato, Japan**

**Filed Mar. 12, 1974, Ser. No. 450,441**

**Claims priority, application Japan, Mar. 15, 1973, 48-30412**

**Int. Cl.² G04B** *19/30*; **G04C** *3/00*

**U.S. Cl. 58—50 R** **1 Claim**



1. An electronic clock apparatus comprising:

a source of standard clock signals;

a time counting device counting said standard clock signals and generating "hour", "minute" and "second" signals;

12 first indicating elements, each of which has a pair of electrodes and which are arranged in a closed loop so as to be responsive to an hour signal from the time counting device;

60 second indicating elements each of which has a pair of electrodes and which are divided into twelve groups, each group constituted by five elements, said groups being arranged in a closed loop so as to indicate both minutes and seconds, responsive to a minute signal and a second signal from the time counting device;

12 first connecting means, each connecting one of the electrodes of respective first indicating elements to one of the electrodes of each second indicating element of a respective group, thus forming 12 units each consisting of one first indicating element and five second indicating elements;

six second connecting means, one of which connects the other electrodes of the first indicating elements and the other five of which connect each of the other electrodes of the corresponding second indicating elements of different groups; and

a time division control means coupled to said time counting device for selectively supplying in a time division fashion the hour, minute and second signals from the time counting device to the corresponding first and second indicating elements via said first and second connecting means.

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## 3,919,836
## MAGNETIC-RESISTANT WATCH CASE

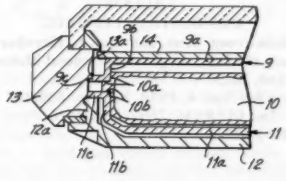
**Akio Nishizawa, Okaya, Japan, assignor to Kabushiki Kaisha Suwa Seikosha, Tokyo, Japan**

**Filed Oct. 15, 1974, Ser. No. 515,032**

**Claims priority, application Japan, Oct. 16, 1973, 48-115321**

**Int. Cl.² G04B** *43/00*, *37/04*

**U.S. Cl. 58—106.5** **9 Claims**



1. A magnetic-resistant watch case assembly comprising a case structure, a watch movement disposed in said case structure, a dial support covering said movement at one side thereof, and a casing-ring covering the movement at the other side thereof, said dial support and casing-ring both being made of high-permeability material and cooperatively surrounding said watch movement, at least one of the dial support and casing-ring including an integral cylindrical portion laterally encircling the watch movement and projecting towards the other, and a lateral rim portion on said cylindrical portion at the end thereof, said watch movement having a step therein, said cylindrical portion and rim portion being seated in said step to position and secure the watch movement in the case structure.

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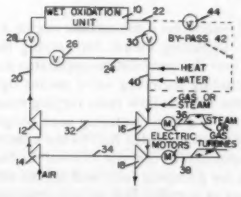
## 3,919,837
## METHOD AND APPARATUS FOR STARTUP OF A WET AIR OXIDATION UNIT PROVIDED WITH ROTATING AIR COMPRESSORS DRIVEN BY ROTATING EXPANDERS

**Louis A. Pradt, Wausau, Wis., assignor to Sterling Drug, Inc., New York, N.Y.**

**Filed Mar. 7, 1974, Ser. No. 448,884**

**Int. Cl.² F02G** *3/00*; **F02C** *7/26*, *1/00*

**U.S. Cl. 60—39.05** **7 Claims**




1. A wet oxidation unit and operating and control means therefor comprising a wet oxidation reactor, a compressor, an expander driving the compressor, a line from the compressor to the inlet of the reactor and a line forming an outlet for the reactor, said outlet line being connected to the expander.

and a bypass between the inlet to the reactor and the outlet, a control valve in the bypass and control valves between the bypass and the inlet end of the reactor and the outlet end of the reactor,

means providing a low flow volume of low pressure air from the compressor through the bypass to the inlet for the expander, and means for heating and saturating the air prior to entry to the expander,

wherein said heated saturated air provides additional power for the expander providing an increase in air flow volume and pressure from the compressor through the bypass.

whereby air from the compressor may be gradually introduced to the reactor initiating the wet oxidation reaction, said valves providing a control in which the exhaust gases from the reactor joins the bypass heated and saturated air to the expander thereby gradually increasing expander energy through a cycle which terminates with a full flow of air from the compressor through the reactor.

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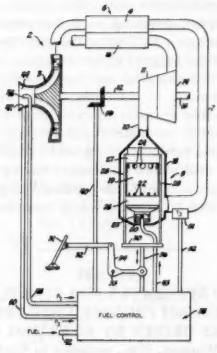
## 3,919,838
## COMBUSTION CONTROL

**Donald J. Armstrong, Troy, and Alan L. Hitzelberger, Grand Blanc, both of Mich., assignors to General Motors Corporation, Detroit, Mich.**

**Filed Nov. 4, 1974, Ser. No. 520,452**
**Int. Cl.² F02C** *7/10, 7/18, 9/10, 9/14*
**U.S. Cl. 60—39.27** **7 Claims**

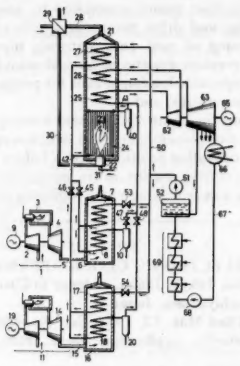


1. A control system for a gas turbine engine having combustion apparatus including means for varying the ratio of primary air flow into the combustion apparatus to total air flow, the system including metering valve means operated in conjunction with the said air flow ratio varying means effective to maintain an effective flow metering area proportional to the said ratio connected to meter fuel to the combustion apparatus; means responsive to the rate of total air flow through the engine; means for pumping fuel; and means effective to control the pressure of pumped fuel so as to maintain the pressure drop across the metering valve means proportional to the square of the said total air flow rate; so as to maintain an approximately constant ratio between fuel flow to the combustion apparatus and primary air flow, thus regulating combustion temperature.

## 3,919,839
## COMBUSTION GAS TURBINE/STEAM GENERATOR PLANT

**Emile Aguet, Winterthur, Switzerland, assignor to Sulzer Brothers Ltd., Winterthur, Switzerland**

**Filed Sept. 24, 1974, Ser. No. 508,865**
**Claims priority, application Switzerland, Oct. 2, 1973, 14081/73**
**Int. Cl.² F02C** *7/00;* **F01K** *13/00*
**U.S. Cl. 60—39.18 B** **7 Claims**



1. A combustion gas turbine/steam power plant comprising at least one gas turbine group including a compressor, combustion chamber and gas turbine interconnected to produce a flow of exhaust gas;

an exhaust-gas steam generator connected to said gas turbine to receive the flow of exhaust gas therefrom, said steam generator including a feed-water preheater for preheating a flow of feed water and an evaporator connected to said preheater to vaporize a flow of preheated feed water therefrom; and

a fired steam generator having an evaporator and a superheater therein, said evaporator of said fired steam generator being connected to said preheater of said exhaust gas steam generator to receive a flow of preheated feed water therefrom, and said superheater of said fired steam generator being connected to said evaporator of said exhaust gas steam generator and to said evaporator of said fired steam generator to receive steam from each.

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## 3,919,840
## COMBUSTION CHAMBER FOR DISSIMILAR FLUIDS IN SWIRLING FLOW RELATIONSHIP

**Stanley J. Markowski, East Hartford, Conn., assignor to United Technologies Corporation, Hartford, Conn.**

**Division of Ser. No. 352,137, April 18, 1973, Pat. No. 3,792,582, which is a division of Ser. No. 84,086, Oct. 26, 1970, Pat. No. 3,788,065. This application Nov. 12, 1973, Ser. No. 415,257**
**Int. Cl.² F02C** *1/00*
**U.S. Cl. 60—39.65** **2 Claims**

1. A folded combustion chamber including:

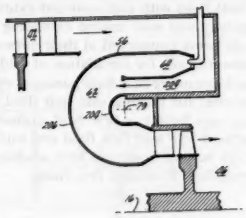
A. a duct having a bend therein of at least 90°,

B. combustion chamber means and a dilutant flow passage located juxtaposition at the upstream end of said duct,

C. means to pass the products of combustion from said combustion chamber means of density $\rho_1$ through duct bend,

D. means to pass a dilutant fluid of density $\rho_2$ through said dilutant flow passage to establish an interfere between said products of combustion and dilutant fluid,

E. said duct bend being of selected curvature such that a tangential velocity $V_{t1}$ is imparted to the products of combustion passing therethrough and a tangential velocity $V_{t2}$ is imparted to the dilutant fluid passing therethrough and so that the product parameter $\rho_2 V_{t2}^2$ is



greater than the product parameter $\rho_1 V_{t1}^2$ to accelerate intermixing between said products of combustion and said dilutant fluid in said duct bend so that said duct bend serves as a dilution zone to cool said products of combustion.

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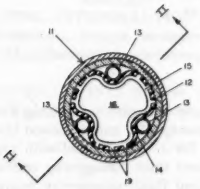
**3,919,841**

## ROCKET MOTOR APPARATUS

**Edward A. Panella, Ridgecrest, Calif., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.**

**Filed July 5, 1974, Ser. No. 486,248**
**Int. Cl.² F02K** *9/04*
**U.S. Cl. 60—255** **3 Claims**



1. A stress relieving rocket motor liner comprising:
a. an insulator layer adjacent to and bonded to the motor case;
b. a plurality of perforated tubes extending longitudinally along and adjacent to the insulator layer;
c. a perforated layer of silicone rubber inside of and adjacent to the inner surfaces of the insulator layer and tubes; and
d. an inhibitor layer inside of and adjacent to the layer of silicone rubber, said inhibitor layer being outside of, adjacent to and bonded to a solid propellant grain and said inhibitor layer being bonded to said insulator layer by means of columns extending through the perforations in the silicone rubber layer.

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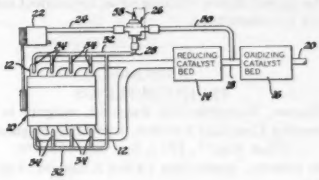
**3,919,842**

## CONTROLLER FOR PROPORTIONAL CONTROL OF REDUCING CONVERTER AIR

**Robert A. Bolton, Sterling Heights, Mich., assignor to General Motors Corporation, Detroit, Mich.**

**Filed May 31, 1974, Ser. No. 474,888**
**Int. Cl.² F01N** *3/10*
**U.S. Cl. 60—289** **4 Claims**

1. In an exhaust emission control system for an internal combustion engine, said system having catalytic converter means including a first catalyst bed and a second catalyst bed, conduit means connected to the engine for receiving exhaust gases discharged from the exhaust ports of the engine and defining a flow path for serially passing the exhaust gases through said first catalyst bed and said second catalyst bed and, means for providing secondary air to said catalyst beds, the improvement comprising a controller for receiving said air and directing a proportional amount of said air to said conduit means upstream of said first catalyst bed and for directing the remainder of said air to said conduit means intermediate said first catalyst bed and said second catalyst bed, said controller including means defiring an inlet flow path for receiving said




air, a first discharge flow path for delivery of air to said conduit means upstream of said first catalyst bed and a second discharge flow path operatively connected to said conduit means intermediate said first catalyst bed and said second catalyst bed, a fixed size orifice passage means positioned between said inlet flow path and said first discharge flow path and valve means positioned to control flow from said inlet flow path to said second discharge flow path, said vlave means including actuator means responsive on one side thereof to pressures in said inlet flow path and said second discharge flow path and on its other side to pressure in said first discharge flow path for effecting actuation of said valve means.

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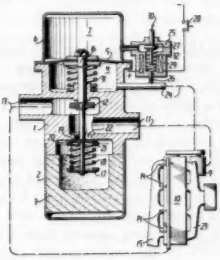
**3,919,843**

## MULTIFUNCTION CONTROL VALVE

**Henri Arnaud, Cerny, and Jean Rene Hergovalch, Bougival, both of France, assignors to Regie Nationale des Usines Renault, Paris, France**

**Filed Sept. 11, 1973, Ser. No. 396,332**
**Claims priority, application France, Dec. 12, 1972, 72.44150; Apr. 6, 1973, 73.12515**
**Int. Cl.² F01N** *3/10;* **F02B** *75/10*
**U.S. Cl. 60—290** **3 Claims**



1. A multifunction control valve for regulating the supply of post-combustion air to the exhaust manifold of an internal combustion engine comprising:
an inlet connected to an air pump;
an outlet supplying air to said exhaust manifold and a diverter outlet to atmosphere through a muffler;
a chamber having a diaphragm disposed therewithin so as to divide said chamber into a delay capacitance and a vacuum chamber, said delay capacitance being connected to

intake manifold vacuum and to atmosphere while said vacuum chamber is always connected to said intake manifold vacuum, said diaphragm being capable of being deflected by said intake manifold vacuum for controlling the closure of one or the other of said outlets by means of a valve; and

a solenoid valve interposed between and interconnecting said delay capacitance and said vacuum chamber for selectively and alternatively subjecting said delay capacitance to said intake manifold vacuum or to atmosphere, said solenoid valve being electrically connnected to a starter switch control circuit of said engine and adapted to be closed during starting so as to connect said capacitance to atmosphere.

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**3,919,844**

## FLUID COUPLINGS

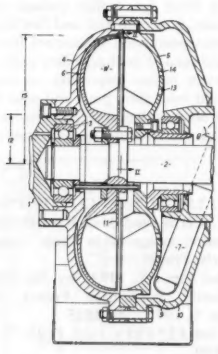
**John Elderton, Hampton Hill, England, assignor to Fluidrive Engineering Company Limited, Isleworth, England**

**Filed Aug. 7, 1974, Ser. No. 495,470**

**Claims priority, application United Kingdom, Aug. 9, 1973, 37840/73**

**Int. Cl.² F16D** *33/00*

**U.S. Cl. 60—330** **12 Claims**



1. In a variable filling fluid coupling having vaned impeller and runner elements together defining a toroidal working circuit for a liquid, comprising the improvement wherein the coupling has a baffle of diameter at least 1.25 times the inner profile diameter of the working circuit, the runner of the coupling has between 10 and 35% more vanes than the impeller of the coupling, and the impeller has two sets of holes through the wall thereof, the centres of one set of holes being spaced from the coupling axis by from 53 to 63% of the outer profile radius of the working circuit and the centres of the second set of holes being spaced from the coupling axis by from 65 to 75% of the outer profile radius of the working circuit.

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**3,919,845**

## DUAL FLUID SINGLE ROTOR TURBINE

**Michael Eskeli, 6220 Orchid Lane, Dallas, Tex. 75230**

**Continuation-in-part of Ser. No. 410,985, Oct. 30, 1973, Pat. No. 3,861,147. This application Nov. 1, 1973, Ser. No. 411,919**

**Int. Cl.² F01K** *27/00*

**U.S. Cl. 60—643** **1 Claim**

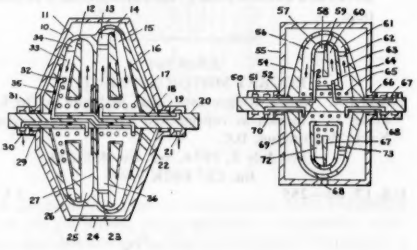
1. A power generator comprising:

a. a means for rotatably supporting a shaft;

b. a shaft;

c. a rotor supported by said shaft so as to rotate in unison therewith, said rotor having:

i. a turbine section comprising a first outward extending passageway and a first inward extending passageway for a first fluid with said outward extending first fluid passageway and said inward extending first fluid passageway being connected at their outward ends and at their inward ends for circulation of said first fluid, said outward extending first fluid passageway having a set of first nozzles for passing said first fluid, said first fluid passageways having a first heat exchanger means for adding heat into said first fluid and said first fluid passageways having a second heat exchanger means for removing heat from said first fluid;



ii. a heat exchanger section comprising a second outward extending passageway and a second inward extending passageway for a second fluid with said outward extending second fluid passageway and said inward extending second fluid passageway being connected at their inward ends and their outward ends for circulation of said second fluid, said outer ends of said second outward extending second fluid passageways having nozzles at their outward ends for passing said second fluid into said inward extending second fluid passageways, said second fluid passageways being provided with a third heat exchanger means for adding heat into said second fluid, and said second fluid passageways being provided with a fourth heat exchanger means for transferring heat from said second fluid into said first heat exchanger means and from there into said first fluid.

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**3,919,846**

## TURBINE BY-PASS ARRANGEMENT FOR THERMAL POWER PLANTS

**Francois Lecocq, Fontenay aux Roses, France, assignor to BBC Brown Boveri & Company Limited**

**Filed Dec. 18, 1973, Ser. No. 425,843**

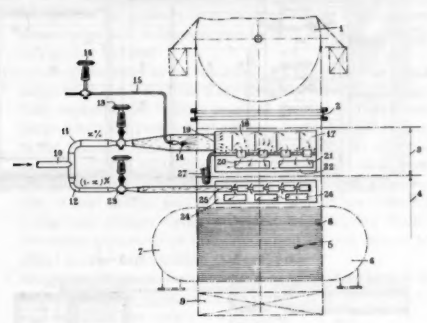
**Claims priority, application France, Jan. 2, 1973, 73.00039**

**Int. Cl. F01k** *17/04, 9/00*

**U.S. Cl. 60—657** **9 Claims**

1. In a thermal power plant including a steam generator supplying steam to a turbine and wherein steam exhausted from the turbine is passed through a coupling sleeve connecting the turbine outlet with the inlet of a condenser and thence returned as condensate to the steam generator, the improvement which comprises means for by-passing steam around the

turbine in two parts, means for decompressing and also desuperheating one such part of the by-passed steam, means for decompressing but not desuperheating the other such part of the by-passed steam, means for introducing the decompressed and desuperheated part of the steam into said coupling sleeve at the turbine outlet side thereof and means for introducing



the decompressed and non-desuperheated part of the steam into said coupling sleeve at the condenser side thereof whereby the desuperheated part of the steam protects the turbine against the nondesuperheated steam part and the non-desuperheated steam part protects the condenser against any water droplets which may escape into the coupling sleeve from the desuperheated steam part.

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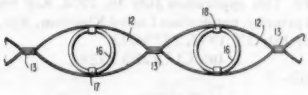
**3,919,847**

## FLOATING ANTI-POLLUTION BARRIER

**Louis Ballu, Colombes, France, assignor to Pneumatiques, Caoutchouc Manufacture et plastiques Kleber-Colombes, France**

**Filed Nov. 27, 1973, Ser. No. 419,334**
**Claims priority, application France, Nov. 27, 1972, 72.42160**
**Int. Cl.² E02B** *15/04*
**U.S. Cl. 61—1 F** **8 Claims**



1. A floating barrier for catching floating materials on the surface of water, comprising a skirt and a floating element secured to one edge of said skirt over the entire length thereof, said floating element consisting essentially of a series of sealed compartments forming closed containers and a series of strips of fabric interlinking said compartments at a separation providing flexibility of said floating element, each of said compartments including

a ring pivotally mounted to an interior side wall of the compartment for being movable between a first inoperative position substantially parallel to said side wall and a second operative position substantially perpendicular to said side wall to provide shape to said compartment,

releasable connecting means mounted on a second interior side wall of said compartment opposite to the pivotal mounting of said ring for holding said ring in said second operative position,

access means formed in a portion of said compartment for providing access into the interior of said compartment sufficient to change the ring position, and

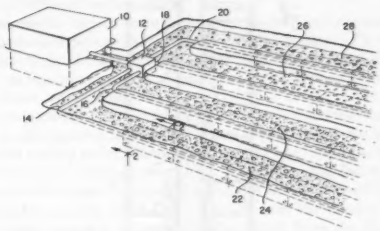
sealing closure means connected to said access means for selectively sealingly closing said access means.

**3,919,848**

## FULL FLOW LEACHING PIT

**A. Eugene Sullivan, 138 Fells Ave., Medford, Mass. 02155**

**Filed May 20, 1974, Ser. No. 471,325**
**Int. Cl.² E02B** *11/00*
**U.S. Cl. 61—11** **32 Claims**



1. A structure for placement in a leaching field to which effluent is applied for disposal, said structure comprising an effluent accumulator in the form of a cistern for temporarily storing excess effluent therein and having means forming a fluid transfer channel therein communicating directly with the field surrounding said accumulator and positioned to admit effluent to said accumulator from said field when the level of effluent in said field is above a given level and to discharge effluent therefrom when the level of effluent in said field is below a given level.

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**3,919,849**

## PROCESS FOR THE AGGLOMERATION AND STABILIZATION OF UNCONSOLIDATED SOIL

**James E. Hessert, and Richard L. Clampitt, both of Bartlesville, Okla., assignors to Phillips Petroleum Company, Bartlesville, Okla.**

**Continuation-in-part of Ser. No. 318,702, Dec. 27, 1972, abandoned, which is a continuation-in-part of Ser. No. 159,052, July 1, 1971, Pat. No. 3,727,687. This application Aug. 15, 1973, Ser. No. 388,542**
**Int. Cl.² E02D** *3/14*
**U.S. Cl. 61—36 R** **10 Claims**

1. A method for the agglomeration and stabilization of unconsolidated soil on the surface of the earth exposed to the atmosphere which comprises the steps of contact said unconsolidated soil, in the presence of sufficient water to form an aqueous gel, with (a) a water-thickening amount of a water-soluble cellulose ether, (b) an amounnt of a water-soluble compound of a reducible polyvalent metal wherein the amount of said polyvalent metal present is sufficient to gel said ether and said water when the valence of at least a portion of the polyvalent metal is reduced to a lower valence state, and (c) an amount of a water-soluble reducing agent wherein the amount of said reducing agent present is sufficient to reduce at least a portion of the polyvalent metal to a lower valence state, thereby converting the thus-contacted unconsolidated soil into a consolidated soil.

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**3,919,850**

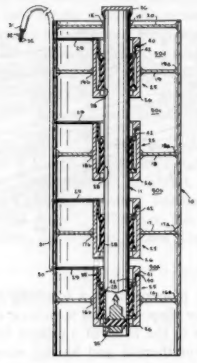
## STRUCTURE AND METHOD OF POSITIONING FOR USE IN WATER COVERED AREAS

**Malcolm G. Coone, and Stanley D. Miller, both of Houston, Tex., assignors to Lynes, Inc., Houston, Tex.**

**Filed May 1, 1974, Ser. No. 465,851**
**Int. Cl.² E02B** *17/00;* **E02D** *23/00*
**U.S. Cl. 61—46.5** **10 Claims**

1. A structure for maneuvering to a desired location in a water covered area comprising:

a. a first elongated, hollow member;
b. bulkheads at longitudinally spaced intervals extending radially inward from said first elongated member;



c. support means secured to said bulkheads;
d. inflatable means carried by said support means for sealing off the space between said bulkheads; and
e. means to inflate said inflatable means.

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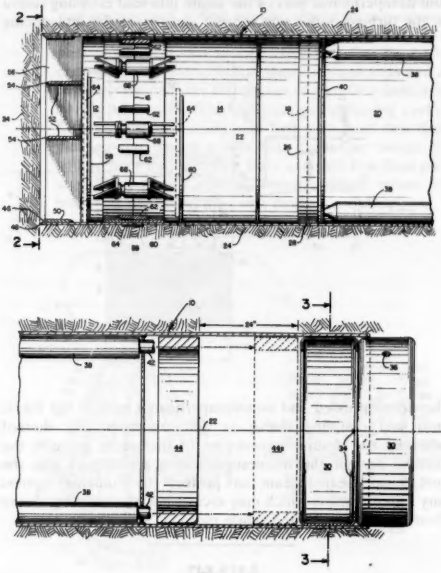
**3,919,851**

## APPARATUS FOR THE EXCEDVATION AND LINING OF SUBTERRANEAN TUNNELS

**Maurice J. Plourde, Newington, Conn., assignor to M & P Pipe Jacking Corporation, Newington, Conn.**

**Filed June 17, 1974, Ser. No. 479,881**
**Int. Cl.[2] E21D** *11/00, 19/00*
**U.S. Cl. 61—85** **10 Claims**

1. In apparatus for the excavation and lining of subterranean tunnels, the combination of a shield assembly comprising a plurality of hollow cylindrical shields arranged in end-to-end coaxial relationship, a first and forwardmost shield having a leading end portion adapted for cutting through subterranean material and being further adapted for steering the shield assembly, and a second shield disposed rearwardly of said first shield and comprising a power shield, a plurality of power jacks disposed in circumaxially spaced relationship within said power shield and each having a forward end portion attached thereto, rearward end portions of said jacks being engageable with a seating means whereby to render said jacks operable simultaneously to urge said power and cutting and steering shields forwardly through said subterranean material, said seating means comprising at least one tunnel liner element cylindrical in form and of a diameter slightly less than the internal diameter of said power shield, said liner element being disposed at least partially within a rear portion of said power shield and supported axially from a rearward end portion, and said seating means also comprising a cylindrical push ring of a diameter slightly less than the internal diameter of said power shield and disposed therewithin between said power jacks and said liner element, and said ring providing for a uniform circumaxial distribution of pressure on said liner element during a power stroke of said jacks, and a plurality of steering jacks disposed in circumaxially spaced relationship and respectively having forward and rearward end portions thereof attached to said cutting and steering shield and said power shield, said jacks being operable selectively to effect slight angular displacements of said cutting and steering shield



from its coaxial attitude whereby to steer precisely the entire apparatus in its progress through the subterranean material.

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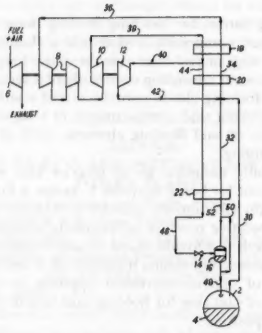
**3,919,852**

## RELIQUEFACTION OF BOIL OFF GAS

**James Kevin Jones, Stalybridge, England, assignor to Petrocarbon Developments Limited, Manchester, England**

**Continuation-in-part of Ser. No. 389,115, Aug. 17, 1973, abandoned. This application July 30, 1974, Ser. No. 493,094**
**Claims priority, application United Kingdom, Apr. 17, 1973, 18484/73; July 27, 1973, 35796/73**
**Int. Cl.[2] F25B** *19/00*
**U.S. Cl. 62—7** **28 Claims**



1. A method of reliquefying gas resulting from evaporation of a ship's cargo of liquefied gas, said method comprising the steps of

i. providing a first stream of compressed gaseous refrigerant;

ii. cooling said stream and work expanding it to provide a first low pressure refrigerant stream which is at a temperature which is below the bubble point of said compressed gaseous refrigerant;

iii. condensing a second stream of compressed gaseous refrigerant by indirect heat exchange with first coolant means provided at least in part by said first low pressure refrigerant stream;

iv. cooling the fluid to be returned as a liquid to the ship's cargo so that it will attain a temperature which is substantially equal to the bubble point of the vapor above said cargo when the pressure of said gas is substantially equal to the pressure of said cargo, said cooling being effected by indirect heat exchange between said fluid and at least one second low pressure refrigerant stream with evaporation of said stream, said at least one second low pressure refrigerant stream being provided by effecting Joule-Thomson expansion of said condensed second stream to effect partial vaporization thereof; and

v. recovering from said cooled gas a condensate which is at substantially the pressure of the ship's cargo for return to said liquefied gas cargo;

said cooling of said first stream of compressed gaseous refrigerant being effected by indirect heat exchange with second coolant means provided at least in part by at least one of said first and second low pressure refrigerant streams, and said first and second low pressure refrigerant streams being thereafter recompressed to provide said first and second stream of compressed refrigerant by compressor means driven by gas turbine means fueled by a fluid hydrocarbon fuel and by said expansion turbine means.

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**3,919,853**

## PROCESS AND APPARATUS FOR COOLING AND/OR LIQUEFYING A GAS OR A GAS MIXTURE

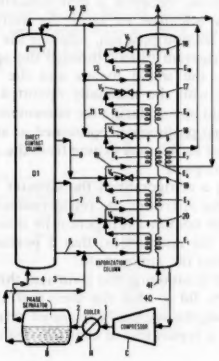
**Alexandre Rojey, Vanves, France, assignor to Institut Francais du Petrole, des Carburants et Lubrifiants, Paris, France**

**Filed Feb. 5, 1974, Ser. No. 439,934**

**Claims priority, application France, Feb. 12, 1973, 73.04945**

**Int. Cl.² F29J** *1/00*

**U.S. Cl. 62—9** **26 Claims**



**1.** In a multistage process for cooling a normally gaseous fluid, comprising compression, in a compression zone, a gaseous mixture of constituents having different boiling points, cooling the so-compressed mixture so as to liquefy a fraction of said compressed mixture; separating the liquefied fraction from the remaining gaseous fraction; vaporizing the liquefied fraction by expansion thereof in indirect contact with the fluid to be cooled, in a first heat exchange zone; forming a second liquid fraction from the remaining gaseous fraction; revaporizing said second liquid fraction by expansion thereof in a second heat exchange zone in indirect contact with said fluid to be cooled; and feeding the compression zone with the vaporized fractions issued from the indirect contact heat exchange zones in order to reconstitute the gaseous mixture of constituents of different boiling points,

wherein the improvement comprises feeding said remaining gaseous fraction under pressure, to the bottom of a substantially vertical direct contact zone, moving said gaseous fraction upwardly through the direct contact zone, in direct countercurrent contact with a liquid reflux for progressively cooling said gaseous fraction and increasing in said gaseous fraction the content of elements having a low boiling point; withdrawing at least one liquid fraction from the direct contact zone, vaporizing the last-mentioned fraction by expansion thereof in said second heat exchange zone in indirect contact with the fluid to be cooled, passing a vapor fraction issued from the direct contact zone through an indirect heat exchange system to cool said vapor fraction in said system by indirect heat exchange contact with at least one liquid fraction withdrawn from the direct contact zone, so as to liquefy at least one portion of said vapor fraction and vaporize said liquid fraction; reintroducing at least one portion of said liquefied vapor fraction into the direct contact zone, at the upper part thereof, and allowing said liquefied vapor fraction to flow downwardly through the direct contact zone as liquid reflux in direct contact with said remaining gaseous fraction which flows upwardly through the direct contact zone.

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**3,919,854**

## GAS SEALING ASSEMBLY

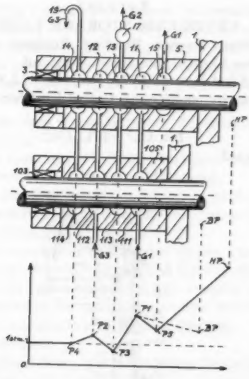
**Louis H. Denis, Paris, France, assignor to Compagnie Francaise D'Etudes et de Construction Technip, Rueil-Malmaison, France**

**Division of Ser. No. 451,367, March 14, 1974. This application Dec. 23, 1974, Ser. No. 535,819**

**Claims priority, application France, Mar. 14, 1973, 73.9121**

**Int. Cl.² F25J** *3/00*

**U.S. Cl. 62—37** **8 Claims**



**1.** Apparatus for liquefying gas, operative in association with a boiler having a flue, comprising:

a compressor including: a stationary body having a higher-pressure side and a lower-pressure side; a shaft extending through the body; and a respective bearing supporting the

shaft at each side, each bearing being arranged at a spacing from the body; a sealing assembly comprising: a respective casing at each of the higher-pressure and lower-pressure sides of the machine and fixed with respect to the stationary body, each casing enclosing a portion of the shaft between the body and the respective bearing and each casing having annular chambers which are open towards the respective shaft portion, said annular chambers including a first chamber, a second chamber which is disposed between the first chamber and the respective bearing, a third chamber between the first and second chambers, a fourth chamber between the second chamber and the respective bearing, the casing at the higher-pressure side of the machine also including a fifth chamber between the first chamber and the body of the machine;

means for introducing a barrier-action gas under pressure into the first chambers;

means for introducing an inert gas under pressure into the second chambers, said means for introducing inert gas into the second chambers including a purification device for treating flue gas of the boiler flue; a monitoring means for monitoring the flue gas purification; an inert gas generator; a nitrogen storage reservoir; the monitoring means being coupled to said inert gas generator and to said nitorgen storage reservoir for causing an output flow from the inert gas generator and/or the nitrogen storage reservoir when a deficiency in the purified flue gas is detected, and causing said output flow to be mixed with the flue gas; a gas flow-producing means for displacing the purified flue gas into the second chambers; a valve operably coupled to the gas flow-producing means to control the output of the gas flow-producing means; and a pressure regulator coupled to sense the pressures in the second and third chambers and operably coupled to said valve to control said valve as a function of the pressures in the second and third chambers;

means connected to the third chambers for producing therein a pressure which is lower than the pressure in the first and second chambers;

a conduit connected to the fourth chambers and open for discharge at a postion remote from the compressor; and means coupled to the lower-pressure side of the compressor for introducing into the fifth chamber gas being handled by the compressor, from the lower-pressure side of the compressor.

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**3,919,855**

## CRYOGENIC STORAGE TANKS

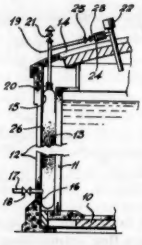
**Frederick Henry Turner, Reading, England, assignor to Simon-Carves Limited, Stockport, England**

**Filed Nov. 5, 1973, Ser. No. 412,894**

**Claims priority, application United Kingdom, Dec. 2, 1972, 55757/72**

**Int. Cl.[2] F17C** *1/02*

**U.S. Cl. 62—45** **18 Claims**




1. A cryogenic storage tank including a side wall comprising an inner skin defining a low temperature liquid tank interior for storing said low temperature liquid at about atmospheric pressure, an outer skin forming an exterior wall of said tank, and means for preventing leakage of contents from said tank interior through said inner skin comprising a chamber defined by said inner and outer skins and a quantity of a non-toxic non-combustible gas stored at sufficiently above atmospheric pressure in said chamber to assure that any leakage occuring through said inner skin is only gas from said chamber to the contents in said tank interior and that leakage of contents from said tank interior through said inner skin is prevented due to the pressure of said gas between said inner and outer skins of the side wall of the tank.

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**3,919,856**

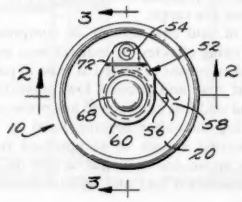
## SELF-CHILLING CONTAINER WITH SAFETY DEVICE AND METHOD OF MAKING SAME

**William D. Beck, 851 S. High St., Columbus, Ohio 43206**

**Division of Ser. No. 348,486, April 6, 1973. This application Mar. 20, 1974, Ser. No. 453,099**

**Int. Cl. B65b** *63/08*

**U.S. Cl. 62—60** **5 Claims**




1. A method for producing a self-chilling unit of the type wherein: a container housing material to be chilled has joined thereto a lid and centrally connected to the lid a canister for storing pressurized refrigerant, manually operated refrigerant release means having an opening therein effective to cooperate with apertures in the lid and canister so as to expose the refrigerant to the atmosphere thereby commencing cooling by having the refrigerant evaporate,

a shield member and a stem-seal member cooperate with manually operated release means and

groove means also cooperating with the manually operated release means so that as the manually operated release means is moved between a first position, whereat the stem-seal is effective to have the refrigerant means sealed, to a second position, whereat the stem-seal permits the refrigerant to exit through the apertures to the atmosphere, the shield means and the groove means cooperating with the manually operated means insure that the shield means during the movement from said first to said second positions, is positioned so as to deflect any unevaporated refrigerant exiting from the apertures comprising the steps of:

a. confining a refrigerant in the canister by introducing through the apertures the refrigerant under pressure;

b. sealing the confined refrigerant by inserting the stem-seal into the aperture so that a portion thereof also extends into the atmosphere,

c. thereafter positioning the stem-seal through the aperture in the lid so that the stem-seal abuts the shield member on the manually operated refrigerant release means in a region that is centrally disposed relative to and

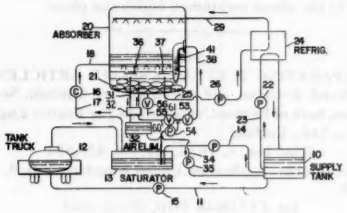
d. securing the canister to the container in a region surrounding the stem-seal and shield member by mechanical working so as to cause a tight frictional engagement therebetween; and

e. affixing the stem-seal to shield member at the region of abutment therebetween, whereby upon lifting said shield member, the canister is opened.

## 3,919,857
## APPARATUS FOR MELTING ICE IN A GASOLINE VAPOR RECOVERY SYSTEM

**Richard A. Nichols, Corona Del Mar, and Henry A. Swindler, Tustin, both of Calif., assignors to Parker-Hannifin Corporation, Cleveland, Ohio**

**Filed Jan. 9, 1974, Ser. No. 431,860**
**Int. Cl.² F25D *21/00***
**U.S. Cl. 62—272** **3 Claims**




1. In a tank containing a supply of cold liquid gasoline that has a temperature below the freezing point of water, an apparatus for melting ice which forms at the bottom of said tank comprising: a hollow header having a series of nozzle means spaced along the longitudinal axis of said header and projecting sidewards in substantially the same direction with their axes inclined relative to the longitudinal axis of the header to spray relatively warm liquid gasoline having a temperature above said freezing point into said supply of sand cold gasoline to mix therewith whereby the temperature of the mixture is above said freezing point, said header having an end near the bottom of the tank extending away from the longitudinal axis in diminishing diameter to form an end nozzle which projects at substantially the same angle and direction as said series of nozzle means to direct the flow of said warm liquid gasoline passing through said end nozzle towards the bottom of the tank.

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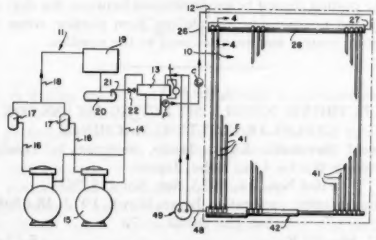
## 3,919,858
## DIRECT LIQUID REFRIGERANT SUPPLY AND RETURN SYSTEM

**Milton W. Garand, Waynesboro, Pa., and Rober C. Fish, St. Louis, Mo., assignors to Frick Company, Waynesboro, Pa.**

**Continuation-in-part of Ser. No. 352,814, April 19, 1973, abandoned. This application May 6, 1974, Ser. No. 467,318**
**Int. Cl.² F25B *1/00***
**U.S. Cl. 62—498** **8 Claims**



1. A direct liquid refrigerant supply and return apparatus including an evaporator for use with a refrigeration system having an accumulator-separator, said apparatus comprising a supply header having an inlet at one end for receiving pressurized liquid refrigerant from the accumulator-separator, a plurality of heat exchange pipes located substantially parallel with each other and generally perpendicular to the supply header, each of said heat exchange pipes being connected at one end to said supply header, a return header in spaced generally parallel relationship to said supply header, the opposite end of each of said heat exchange pipes communicating with said return header, said return header having discharge means at one end for discharging vaporized and unevaporated refrigerant therefrom, said discharge means being diametrically opposite said inlet to said supply header so that the refrigerant flow paths from the inlet of said supply header through said heat exchange pipes and said return header are substantially of equal resistance, a vapor-liquid lift apparatus including a receptacle for receiving vaporized and unevaporated refrigerant from the discharge means of said return header, at least one discharge pipe having one end extending into said receptacle and the other end communicating with the accumulator-separator, the unevaporated refrigerant being entrained in the vaporized refrigerant within said receptacle, and means for moving the vaporized refrigerant and the unevaporated refrigerant entrained therein to the accumulator-separator at a velocity to maintain the entrainment of the unevaporated refrigerant.

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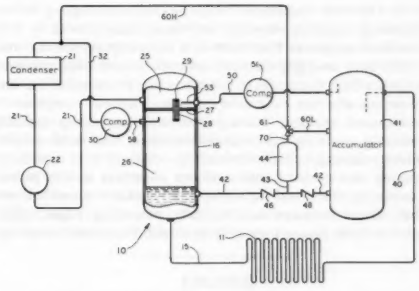
## 3,919,859
## REFRIGERATING SYSTEM

**Robert R. Ross, Wheaton, Ill., assignor to H. A. Phillips & Co., St. Charles, Ill.**

**Filed Nov. 18, 1974, Ser. No. 524,779**
**Int. Cl.² F25B *43/00***
**U.S. Cl. 62—503** **4 Claims**




1. A recirculating refrigeration system, comprising:
a. compressor means for compressing vaporized refrigerant,
b. condenser means for receiving compressed refrigerant gas from said compressor means and removing heat from said compressed gas to liquify all of a substantial portion of it,
c. receiver tank means for receiving liquified refrigerant from said means,
d. said receiver tank means including an upper chamber and a lower chamber separated by a bulkhead,
e. said upper chamber being connected to said condenser means for receiving said liquified refrigerant from said condenser means,
f. liquid level control means in said upper chamber for permitting a predetermined level of liquid refrigerant to accumulate on said bulkhead while causing any additional amount of liquid refrigerant to flow into said lower chamber and accumulate in a sump therein,
g. evaporator means,
h. liquid refrigerant from said sump being forced from said lower chamber to and through said evaporator means,
i. at least a substantial portion of said vaporized refrigerant from said evaporator means being returned to said upper chamber of said receiver tank means and introduced to said upper chamber below the level of liquid refrigerant on said bulkhead so as to cool said vaporized refrigerant,
j. means for permitting said cooled, vaporized refrigerant

to return from said upper chamber to said lower chamber above said sump, and

k. means for returning said cooled, vaporized refrigerant from said lower chamber to said compressor means.

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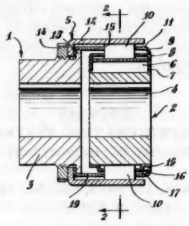
## 3,919,860
## FLEXIBLE COUPLING

**H. Dolfsma, Jutphaas, Netherlands, assignor to SKF Industrial Trading and Development Company B.V., Jutphaas, Netherlands**

**Filed Sept. 24, 1973, Ser. No. 400,283**
**Claims priority, application Netherlands, Oct. 4, 1972, 7213389**
**Int. Cl. F16d** *3/64*
**U.S. Cl. 64—14** **17 Claims**



1. In a flexible coupling of a type having two coupling halves comprising coupling elements for transmitting power by way of resilient members fixed between the coupling halves, and wherein each coupling element has radially extending portions between which the resilient members are positioned; the improvement wherein each said coupling element comprises a band-shaped member having apertures extending radially thereto for receiving said resilient members, said band-shaped members having radially extending edges at said apertures engaging the sides of said resilient members in the power transmitting direction, whereby said resilient members are tightly fitted between said radially extending edges when loaded in both power transmitting directions of said coupling.

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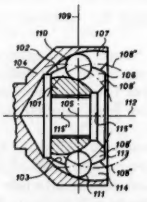
## 3,919,861
## HOMOKINETIC JOINT

**Andrea Bellomo, Strada Sant' Anna No. 82/6, Turin, Italy**

**Filed Jan. 4, 1971, Ser. No. 103,490**
**Claims priority, application Italy, Jan. 21, 1970, 67160/70**
**Int. Cl. F16d** *3/30*
**U.S. Cl. 64—21** **7 Claims**



1. A homokinetic joint comprising as inner spherical element with curved grooves on its spherical surface located in the inner spherical surface, having curved grooves, of an outer element ring or bell, an even number of driving balls, each ball engaged by a groove of the inner element and by a groove of the outer element, these grooves crossing symmetrically in the equatorial plane, which is the plane containing the spherical center of articulation of the joint and is at right angles with the axis of the aligned shafts, the joint being characterized by the fact that the geometrical axes of two opposite grooves of each element are arcs of the same circle lying on a plane at inclination with respect to the axis of the aligned shafts and at a distance from the spherical center of the joint, this distance correcting the geometry of the joint increasing the bearing and guiding arc of the ball, the centers of the geometrical axes of the grooves of the inner element being all on a plane parallel to the above mentioned equatorial plane and at equal distance between each other and the centers of the geometrical axes of the grooves of the outer element being symmetrical to the before mentioned centers, relative to the inner element, with respect to the above mentioned equatorial plane.

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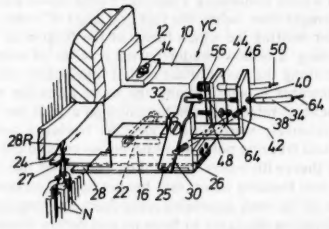
## 3,919,862
## SEPARATING TUBULAR KNITTED ARTICLES

**Gillies Wood, Evington, and Alfred Edward Mitchell, Newbold Verdon, both of England, assignors to The Bentley Engineering Co. Ltd., England**

**Filed Feb. 6, 1974, Ser. No. 439,854**
**Claims priority, application United Kingdom, Feb. 9, 1973, 6517/73**
**Int. Cl.² D04B** *9/10, 35/00, 9/46*
**U.S. Cl. 66—14** **6 Claims**



1. A method of knitting on a circular knitting machine having a loop-holding instrument operable to a higher level than needles of the machine, comprising the steps consisting of:

A. pressing off a previously knitted article from needles at a first position on the circumference of the knitting machine;

B. simultaneously feeding a yarn to needles at a second position on the circumference to start a set-up course for the next succeeding article, said set-up course commencing with a yarn portion extending from the needles to the loop-holding instrument;

C. projecting a cutting device into the path of the yarn portion; and

D. cutting the yarn portion by means of the cutting device, the cutting device being positioned between the first and second positions to engage the yarn portion when the set-up course has been secured to the needles.

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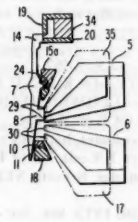
## 3,919,863
## ELECTRONIC NEEDLE SELECTING MEANS FOR CIRCULAR KNITTING MACHINES

**Masatoshi Sawazaki, Kobe, Japan, assignor to Precision Fukuhara Works, Ltd., Kobe, Japan**

**Filed Nov. 14, 1973, Ser. No. 415,761**
**Claims priority, application Japan, May 8, 1973, 48-050864**
**Int. Cl.² D04B** *15/78*
**U.S. Cl. 66—50 R** **5 Claims**

1. An electronic needle selecting device for a circular knitting machine having a slotted needle cylinder and a circle of needles disposed in and independently movable lengthwise of said cylinder slots, a circle of jacks disposed in said cylinder slots below said needles and independently movable lengthwise of said slots to raise said needles, said jacks also being rockable in said cylinder slots about individual fulcrums intermediate their ends and having butts above their fulcrums, a

jack raise cam to engage said jack butts to raise said jacks and said needles from a first to a second level, a jack aligning cam acting upon said jacks below their fulcrums to rock the jacks so that their said butts are moved radially outwardly of said cylinder slots into the path of said jack raise cam, selectively pulsed electromagnetic means thereafter acting upon said jacks below their fulcrums to rock selected ones of said jacks so that their butts are moved radially inwardly of said cylinder



slots, said jack raise cam thereafter raising only those of said jacks which have not been so selected and rocked by said electromagnetic means, and permanent magnetic means adapted to exert force upon said jacks above and below their said fulcrums prior to, during and after the selecting action of said electromagnetic means upon said jacks, said force acting upon all of said jacks above and below said fulcrums prior to said selecting action on said jacks to maintain the latter in the position to which they are rocked by said jack aligning cam.

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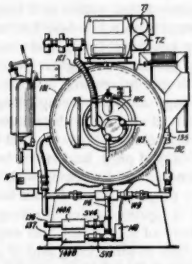
**3,919,864**

## DYEING MACHINE

**Norvin Leroy Pellerin, New Orleans, La., assignor to Pellerin Milnor Corporation, New Orleans, La.**

**Filed May 7, 1973, Ser. No. 357,609**
**Int. Cl.[2] D06B** *5/22, 23/22, 23/30*
**U.S. Cl. 68—12 R** **2 Claims**



1. A dyeing machine which comprises in combination:
a stationary housing,
a perforate drum mounted to rotate within said housing,
means for selectively introducing hot and cold water into said housing to form a bath therein, said drum being positioned to rotate through said bath,
a plurality of supply tanks mounted on said housing,
means for selectively injecting supplies from said tanks into said housing and the bath therewithin,
an external steam jacket on the wall of said housing,
said steam jacket comprising a plurality of parallel laterally spaced channel members extending part way around said drum and terminating in transverse headers, said channel members having their edges welded directly to the wall of said drum, and a plurality of arcuate plates bridging the spaces between said channel members and welded thereto so as to form additional channels terminating in said headers,
means for selectively introducing water and steam into the said jacket, and
electrical control means for adjustably and automatically controlling the introduction of hot and cold water into said housing and jacket, the introduction of steam into said jacket, and the injection of supplies from said tanks into said housing in a predetermined succession of steps in order to carry out a dyeing cycle.

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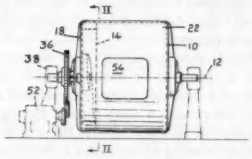
**3,919,865**

## SPIRAL DRAIN SCOOP FOR ROTATING DRUM

**Robert J. Glandfield, Kitchener, Canada, assignor to Canbar Industrial Plastics, Waterloo, Canada**

**Filed June 27, 1974, Ser. No. 483,627**
**Claims priority, application Canada, Aug. 3, 1973, 178134**
**Int. Cl.[2] C14C** *15/00*
**U.S. Cl. 69—30** **13 Claims**



2. A spiral drain scoop attached to an end wall of a rotating drum having a central axis of rotation and a cylindrical outer wall to expel liquid from the drum through an outlet in said end wall, the outlet being co-axial with the axis of rotation of the drum, the spiral scoop defining a continuous passage having an outer pick-up portion extending along the outer wall of the drum and a spiral shaped enclosed inner conductive portion extending between the outer pick-up portion and the outlet in said end wall, the cross-sectional area of the inner conductive portion of the passage gradually varying along its length to a minimum substantially midway between the outlet in the end wall and the outer pick-up portion of the passage.

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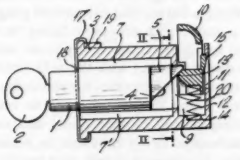
**3,919,866**

## LOCK WITH PUSH-BUTTON OPERATED BOLT

**Paul Lipschutz, Croissy-sur-Seine, France, assignor to Societe d'Exploitation des Brevets NEIMAN, Courbevoie, France**

**Filed Oct. 19, 1973, Ser. No. 408,209**
**Claims priority, application France, Oct. 20, 1972, 72.37254; Feb. 28, 1973, 73.07027**
**Int. Cl.[2] E05B** *65/44*
**U.S. Cl. 70—81** **10 Claims**



1. A key-responsive safety lock with a movable lock-bolt biased by a spring to be mounted on a closure construction consisting of a movable closure panel and a stationary frame, said lock comprising a push-button having a ramp operating the retraction of said bolt against the action of said spring, said push-button forming a barrel-like cylindrical plug of the safety lock housed in a stator and accomodating tumbler means, said

push-button being movable in rotation and translatory motion through direct contact with said stator, said stator being formed with a pair of grooves for receiving said tumbler means, said stator being directly secured to one of the two elements consisting of said closure panel and said stationary frame, said push-button being movable in rotation between two angular rotary positions wherein said tumbler plates and said grooves being aligned with one another, said lock-bolt comprising a protrusion engageable with said ramp so that said spring urging said lock-bolt back into its operative outward extending locking position serves at the same time the purpose through reaction of said protrusion on said ramp of moving said push-button back into its outward projecting position when this is allowed by the orientation of said push-button with respect to said grooves of said stator, wherein said ramp of said push-button is formed with a shoulder, whereas said stator has an intermediate partition wall situated between those stator portions in which said push-button and said lock-bolt are disposed and formed with a window serving to guide said push-button, said shoulder and one edge of said window being in abutting relationship in the one of said rotary positions of said push-button corresponding to the lock-bolt locking position thereof.

3. A key-responsive safety lock with a movable lock-bolt biased by a spring to be mounted on a closure construction consisting of a movable closure panel and a stationary frame, said lock comprising a push-button having a ramp operating the retraction of said bolt against the action of said spring, said push-button forming a barrel-like cylindrical plug of the safety lock housed in a stator and accommodating tumbler means, said push-button being movable in rotation and translatory motion through direct contact with said stator, said stator being formed with a pair of grooves for receiving said tumbler means, said stator being directly secured to one of the two elements consisting of said closure panel and said stationary frame, said push-button being movable in rotation between two angular rotary positions wherein said tumbler plates and said grooves being aligned with one another, said lock-bolt comprising a protrusion engageable with said ramp so that said spring urging said lock-bolt back into its operative outward extending locking position serves at the same time the purpose through reaction of said protrusion on said ramp of moving said push-button back into its outward projecting position when this is allowed by the orientation of said push-button with respect to said grooves of said stator, wherein said lock-bolt comprises stop means formed by a laterally outwardly protrusion appendix and said stator comprises means constituted by a window provided in the corresponding wall of said stator, said appendix and one edge of said window being in abutting relationship when said lock-bolt is in its locking position.

7. A key-responsive safety lock with a movable lock-bolt biased by a spring to be mounted on a closure construction consisting of a movable closure panel and a stationary frame, said lock comprising a push-button having a ramp operating the retraction of said bolt against the action of said spring, said push-button forming a barrel-like cylindrical plug of the safety lock housed in a stator and accommodating tumbler means, said push-button being movable in rotation and translatory motion through direct contact with the said stator, said stator being formed with a pair of grooves for receiving said tumbler means, said stator being directly secured to one of the two elements consisting of said closure panel and said stationary frame, said push-button being movable in rotation between two angular rotary positions wherein said tumbler plates and said grooves being aligned with one another, said lock-bolt comprising a protrusion engageable with said ramp so that said spring urging said lock-bolt back into its operative outward extending locking position serves at the same time the purpose through reaction of said protrusion of said ramp of moving said push-button back into its outward projecting position when this is allowed by the orientation of said push-button with respect to said grooves of said stator, a second helical spring coaxial with said push-button and urging same back into outward protruding position being provided, wherein said lock-bolt is formed with a side nose, said lock-bolt biasing spring is offset with respect to the center line of said lock-bolt and bearing upon said side nose, a portion of said lock-bolt, lying below said protrusion of said lock-bolt, is shaped into a bevel at an angle mating with that of said ramp of said push-button so as to provide for the end of said push-button a housing when said push-button, if placed in the locking position of said key and if the latter is removed, may be depressed inwards against the action of said second spring.

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## 3,919,867

## ANTI-THEFT SAFETY LOCK DEVICE WITH MEANS PREVENTING ITS UNALLOWED REMOVAL FROM THE LOCK-HOLDER

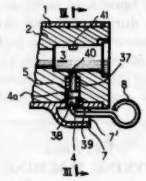
**Paul Lipschutz; Yves Remontet, both of Croissy sur Seine, and Jean Leroy, Saint Cyr L'Ecole, all of France, assignors to Societe d'Exploitation des Brevets NEIMAN, Courbevoie, France**

**Filed Nov. 26, 1973, Ser. No. 419,002**

**Claims priority, application France, Nov. 24, 1972, 72.41783**

**Int. Cl.[2] B60R** *25/02*; **E05B** *9/06*

**U.S. Cl. 70—186** **8 Claims**




1. An anti-theft device including an operator's key-responsive safety lock comprising: a stationary hollow casing; a body portion forming a stator provided with a longitudinal bore and removably mounted in said casing; a tumbler cylinder forming a rotary plug rotatably fitted within said longitudinal bore of said stator and formed with a key-hole for receiving a removable plug-actuating key for rotating said plug in either direction to and from a plurality of angular positions; said casing being provided with a hole opening at least at the inner wall surface of said casing; said rotary plug being provided on its radially outer side wall surface with a recess adapted to be aligned in registering relationship with said hole through rotary displacement of said plug; said stator being formed with a transversely extending bore opening with its opposite ends towards said rotary plug and towards said hole of said casing, respectively; and a spring-loaded locking finger slidably mounted in said bore of said stator and engageable endwise with either of said hole in said casing and of said recess in said rotary plug, said locking finger having such a length that upon its engagement with said hole in said casing, said finger securely locks said stator within said casing and is disengaged from said recess in said rotary plug and that upon the engagement of said finger with said recess in said rotary plug, said finger disengages said hole in said casing thereby releasing said stator from said casing, said locking finger being biased by its spring so as to be urged towards its casing hole engaging position; wherein the improvement consists in the provision of means adapted to prevent said locking finger to be subjected to a coaxial radially inwards directed thrust force capable to cause said locking finger to be driven into the side wall of said rotary plug when the angular position of the latter is such that said recess in said plug is out of alignment with said locking finger, said hole in said casing extending throughout the thickness of the wall of said casing so as to open to the outside thereof, said means preventing the application of such a thrust force including hole-guard means rigidly secured to the out-

side wall of said casing and covering said hole in said casing in spaced relationship therewith, said hole-guard means being formed with at least one sidewise located opening the centre line axis of which is substantially at right angles to the longitudinal axis of said hole whereas the plane of said opening is parallel with said longitudinal axis of said hole and laterally offset with respect thereto.

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**3,919,868**

## ANTI-THEFT DEVICE FOR MACHINES EQUIPPED WITH A DIESEL OR LIKE ENGINE

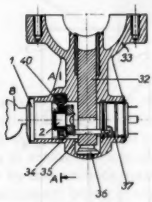
**Paul Lipschutz, Croissy-sur-Seine, France, assignor to Societe d'Exploitation des Brevets, NEIMAN, Courbevoie, France**

**Filed Jan. 23, 1975, Ser. No. 543,290**

**Claims priority, application France, Feb. 6, 1974, 74.03899**

**Int. Cl.² B60R** *25/02, 25/04*

**U.S. Cl. 70—239** **9 Claims**



**1.** An anti-theft device for a vehicle having an internal combustion engine and a fuel injection pump, said device comprising a lock, a bolt operable by said lock to be moved between locking and unlocking positions in which it locks and unlocks respectively, an element of the vehicle essential to the safe operation of that vehicle, an electrical switch operable by said lock and adapted for connection in a circuit starting said vehicle, drive means operable by said lock, drive transmitting means connected to said drive means and connectable to a fuel injection pump of a vehicle, to transmit pump opening and closing movement to said pump upon operation of said lock, said drive and drive transmitting means constituting means first causing said bolt to be moved to said unlocking position before said pump is opened as the lock is moved in a direction to cause pump opening movement of said transmission and, when said lock is moved in the direction to cause pump closing movement of said transmitting means, first causing said pump to be closed before said bolt is moved to said locking position.

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**3,919,869**

## MAGNETIC DOOR LOCK SYSTEM

**Walter Fromm, Berlin, Germany, assignor to Zeiss Ikon AG, Germany**

**Filed May 15, 1974, Ser. No. 470,188**

**Claims priority, application Germany, May 19, 1973, 2325566**

**Int. Cl.² E05B** *35/14, 47/04, 56/36, 57/00*

**U.S. Cl. 70—263** **3 Claims**

**1.** A magnetically coded door locking system comprising:

a key having

a pair of longitudinal surfaces, and

a strip having a magnetically readable intelligence on one of said surfaces;

a lock having

a rotatable cylinder into which said key may be inserted on a path, and

a dynamic magnetic reading device adjacent said insertion path in said cylinder and adjacent said magnetic strip on said key;

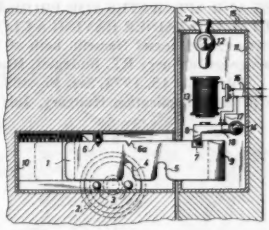
control means having

input circuit means cooperating with said magnetic reading device in said lock,

comparison means for comparing said intelligence on said magnetic strip of said key during insertion of said key into said lock cylinder with a control code stored in the comparison means, and

output circuit means cooperating with an actuating means;

said actuator means having



an electro-magnet connected in said output circuit,

an armature having a catch opposite a pivot bearing about which the catch may pivot toward and away from said electro-magnet in response to changes in the current flow through said electro-magnet provided by said output circuit, and

a door bolt movable to and from engagement with said latch, the bolt having an open position, a latched position, and a caught or locked position, said bolt being moved among its positions by a manually rotatable knob and being immobilized in its locked position by said catch on said armature.

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**3,919,870**

## METHOD OF CLEANING TOOL PARTS IN EXTRUDERS

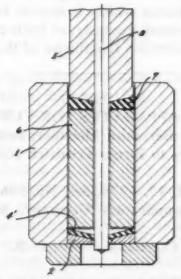
**Johann Wassen, Brackwede, and Josef Hesse, Hilden, both of Germany, assignors to Mannesmannrohren-Werke AG, Dusseldorf, Germany**

**Filed Aug. 14, 1974, Ser. No. 497,190**

**Claims priority, application Germany, Aug. 17, 1973, 2342170**

**Int. Cl.² B21C** *35/06, 23/00*

**U.S. Cl. 72—39** **1 Claim**



**1.** Method of cleaning a work holder, die, mandrel, and a press punch or ram of an extrusion press used for extruding a blank covered with a lubricant, comprising:

placing a compressed mica disk, from which at least 90 percent of the water of crystallization has been removed, directly between the blank and the press punch or ram

prior to extrusion, the disk being of annular configuration and engaging the work holder and the mandrel; and

extruding the disks in the final phases of extrusion of the blank, so that only a small portion of the disk remains in front of the die, and remains therein to be extruded ahead of extrusion of the next blank, for which extrusion another mica disk is placed between the ram and the said next blank in the same manner as in the previous extrusion.

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3,919,871

## PROCESS AND APPARATUS FOR PRODUCING A NECK ON A METAL CONTAINER HAVING A CLOSED BOTTOM

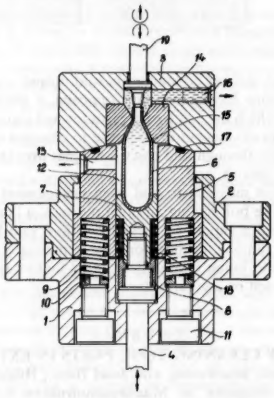
**Ivan Andrasev, and Jozsef Nemeth, both of Budapest, Hungary, assignors to Novex RT, Budapest, Hungary**

**Filed July 15, 1974, Ser. No. 488,763**

**Claims priority, application Hungary, July 13, 1973, AA-743**

**Int. Cl.² B21D** *26/04*

**U.S. Cl. 72—55** **8 Claims**



1. A process for the production of a neck on a metal container having a closed bottom, comprising placing a metal container having a closed bottom in a press with the closed bottom of the metal container supported by the press, subjecting both the interior and the exterior of the container to the pressure of a fluid under positive pressure, and while maintaining said positive pressure reducing the internal diameter of the end of said container which is remote from said closed bottom by pressing simultaneously on both ends of the container in opposite directions lengthwise of the container.

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3,919,872

## METHODS AND APPARATUS FOR TUBE ROLLING

**Werner Demny, and Hermann Moeltner, both of Dusseldorf, Germany, assignors to Firma Friedrich Kocks, Dusseldorf, Germany**

**Filed Sept. 17, 1974, Ser. No. 506,844**

**Claims priority, application Germany, Sept. 24, 1973, 2347891**

**Int. Cl.² B21B** *17/00, 19/02*

**U.S. Cl. 72—205** **10 Claims**

1. A method of rolling tubes under tension in a multi-pass stretch-reducing rolling mill, in which, during the entry of the leading end portion of the tube into and the exit of the trailing end portion of the tube from the region of those passes of the rolling mill which are at the entry end when viewed in the direction of rolling and which build up the tension subjecting the tube, at least in the respective penultimate pass of those passes which build up the tension, to a maximum tractive force, which is limited only by the transmission capacity of the frictional forces between the rollers and the tube and is created by causing the relevant peripheral speed of the rollers in such passes at each point of contact surface between the rollers and the tube to be greater than the speed of the tube passing through said rollers.

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3,919,873

## EXTRUSION MEMBER FOR POSITIONING BEHIND THE REAR FACE OF MATERIAL TO BE EXTRUDED IN AN EXTRUSION PRESS

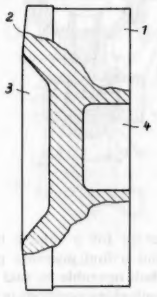
**Amit Kumar Biswas, Kaarst, and Robert S. Leventer, Dusseldorf, both of Germany, assignors to Schloemann-Siemag AG, Duesseldorf, Germany**

**Filed Apr. 15, 1974, Ser. No. 461,235**

**Claims priority, application Germany, Apr. 16, 1973, 2319139**

**Int. Cl.² B21C** *35/00*

**U.S. Cl. 72—257** **19 Claims**



1. An extrusion member for positioning behind the rear face of a billet to be extruded in an extrusion press, for transferring the force of an extrusion ram to said billet, said extrusion member having an outer, annular, billet-engaging front face which is slightly inclined rearwardly and outwardly, said front face surrounding a central recess defined in the front of said extrusion member by a base and sides which are impermeable to air, whereby air is trapped in said recess when said extrusion member engages said rear face of said billet and said air is compressed by partial entry of material of said billet into said recess.

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3,919,874

## HEADING MACHINES

**Lewis Nigel Harris, Stourbridge, England, assignor to GKN Screws & Fasteners Limited, Warley, England**

**Filed June 17, 1974, Ser. No. 480,036**

**Int. Cl.² B21D** *28/00*

**U.S. Cl. 72—337** **4 Claims**

1. A heading machine for producing headed blanks from wire, the machine comprising:

a fixed frame;

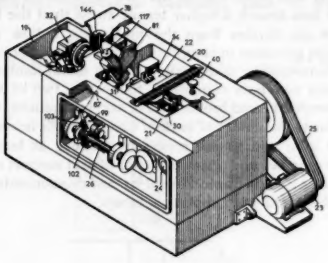
a ram reciprocable in the frame;

a punch carried by the ram;

a die block rotatably mounted on the frame and having a plurality of die cavities capable of being indexed between a plurality of stations including a cut-off station and a blow station;

feed means for feeding the wire stock intermittently directly into a die cavity positioned at the cut-off station, the feed means comprising a pair of opposed linear gripper means which cam embrace and grip the wire over a substantial length thereof and mounted on a block drivable slidably in a direction longitudinally of the fixed frame by drive means, one gripper means being secured to a lever piv-

oted on said block and being resiliently biased away from the other gripper means, the feed means also including a cam member having a longitudinal cam face comprising a pair of spaced planar surfaces generally parallel to the direction of feed of the wire stock and a ramp between the planar surfaces, the lever having a part adapted to co-operate with the cam face, whereby, as the block is moved forwardly by the drive means, the cam urges the



lever and hence said one gripper means against the resilient bias towards the other gripper means until said co-operating part contacts the ramp whereupon said one gripper means is resiliently urged away from the other gripper means by the resilient biasing means;

and a cut-off mechanism being provided adjacent the cut-off station and acting upon the wire stock to sever a blank therefrom.

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**3,919,875**

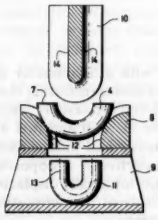
**METHOD OF AND APPARATUS FOR MAKING HIGH PRESSURE TUBE BENDS, ESPECIALLY FOR THE CHEMICAL INDUSTRY**

**Radko Maev; Cestmir Zacek; Petr Janak; Jan Strecha, all of Brno; Josef Duzy, and Ludek Lucak, both of Ostrava, all of Czechoslovakia, assignors to Kralovopolska strojirna, narodni podnik, Brno-Kralovo Pole, Czechoslovakia**

**Filed Aug. 9, 1974, Ser. No. 496,121**

**Int. Cl.[2] B21D** *9/08*

**U.S. Cl. 72—369** **3 Claims**



**1.** Method of producing tube bends for high pressure and high temperature use, comprising hot bending a seamless tube whereby to provide a semi-finished generally U-shaped product having legs disposed angularly with respect to each other, filling such semi-finished product with sand and tamping it in place, closing the ends of the thus sand-filled semi-finished product with lids, again heating the thus prepared semi-finished product to bending temperature, and then thrusting the heated semi-finished product downwardly through a female die by an aligned male die, whereby to reduce the angle between the legs of the product and to produce a tube bend of oval form the longer axis of which is parallel to the bending axis of the semi-finished product and has a length which is 3 to 4 percent longer than its shorter axis, thereafter removing the covers from the product and the sand from within it and, after again heating the thus formed product, calibrating it so as to change the oval cross-section thereof into a section which is circular in cross-section.

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**3,919,876**

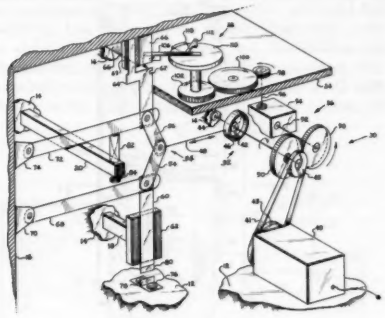
**TOGGLE PRESS**

**Fransiscus Cornelius Bakermans, Shiremanstown, Pa., assignor to E. I. Du Pont de Nemours & Co., Wilmington, Del.**

**Filed Nov. 11, 1974, Ser. No. 522,882**

**Int. Cl.[2] B21J** *9/18*

**U.S. Cl. 72—451** **10 Claims**



**1.** A press comprising,

a frame including a base for receiving a workpiece,

a toggle linkage operably mounted in said frame,

a first ram connected to a first link of said toggle linkage for reciprocally engaging a workpiece positioned in said base,

first thrust absorbing means fixedly mounted on said frame away from said base,

a second ram connected to a second link of said toggle linkage for reciprocally engaging said first thrust absorbing means,

second thrust absorbing means for engaging between said second ram and said first thrust absorbing means, said second thrust absorbing means having a thickness substantially equal to the spaced distance between said first ram and said base, so that engagement of said second thrust absorbing means between said first thrust absorbing means and said second ram causes said first ram to reciprocally engage the workpiece positioned on said base when said toggle linkage is extended.

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**3,919,877**

**TOOL**

**Louis A. Netta, North Brunswick, N.J., assignor to Thomas & Betts Corporation, Elizabeth, N.J.**

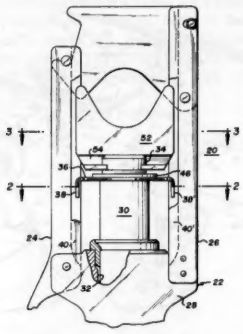
**Filed Nov. 6, 1973, Ser. No. 413,341**

**Int. Cl.[2] B21D** *37/06;* **B21J** *13/04*

**U.S. Cl. 72—456** **4 Claims**

**1.** In a fluid operated tool of the type having frame means, piston means reciprocatingly movable within said frame means, and a die member releasably connected to said piston means for reciprocating movement within said frame means, the improvement comprising: said frame means including first and second members extending generally parallel to the path of travel of said piston means, and having key receiving means comprising a grooved portion extending along the length of the interior of each of said first and second members; key means including opposingly disposed downturned shoulder portions each slidably engaging a respective one of said first and second member grooved portions said piston means having a head portion of reduced diameter integral therewith and protruding longitudinally from the free end thereof, said head

portion having an asymmetrically formed key means engaging portion located adjacent the junction between said piston means and said head portion, said key means having an asymmetrically formed transverse aperture conforming to said key means engaging portion and within which said key means engaging portion is seated to prevent the rotation of said key means about the longitudinal axis of said piston means; said die member having a foot portion disposed generally normal to the plane thereof, said piston means head portion having a slotted portion extending generally transverse to the longtiudinal axis of said piston means and located adjacent said key means engaging portion, said die member foot portion being



engaged within said head portion slotted portion for corresponding movement therewith, said die member foot portion being transversely slidable within said head portion slotted portion; and pivot means coupling one of said frame means first and second members to said frame means and arranged to permit said one of said first and second members to be pivoted away from an associated one of said key means shoulder portions and to permit free access to said die member while the other of said key means shoulder portions is engaged within said grooved portion of the other of said frame means first and second members to prevent loss of orientation between said piston means and said frame means upon removal of said die member.

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**3,919,878**

## PRESS WITH A PRESTRESSED FRAME

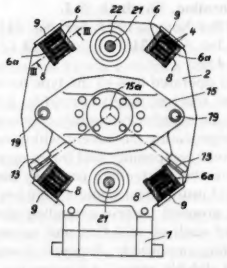
**Horst Hans Groos, Metzkausen, Germany, assignor to Schloemann-Siemag AG, Duesseldorf, Germany**

**Filed June 11, 1974, Ser. No. 478,391**

**Claims priority, application Germany, June 20, 1973, 23313180**

**Int. Cl.[2] B21D** *37/10*

**U.S. Cl. 72—456** **8 Claims**



1. A press comprising a press axis; a cylinder cross-member; press ram means; cylinder means mounted by said cylinder cross-member for moving said press ram means along the press axis; a counter cross-member; at least two tie members in tension interconnecting said cylinder cross-member and said counter cross-member, each said tie member comprising a stack of separate and unbonded sheet metal laminations each said lamination being of generally rectangular cross-section and having two parallel broad sides and two narrow sides, the perpendicular to the center of each said broad side intersecting said press axis so that the laminations closest to the press axis absorb a higher tensile stress than the laminations which are further from the press axis; hollow rectangular support members in compression between said cross-members and surrounding said stacks of sheet metal laminations, said support members comprising four walls, two of which walls are parallel to said broad sides of said laminations, the perpendicular to the center of each of said two walls intersecting said press axis; and spacer members between at least one said cross-member and respective ends of said support members to prestress a press frame formed by said cross-members, said tie members and said support members.

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**3,919,879**

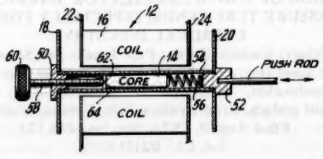
## ELECTRICAL ZEROING MEANS FOR A DILATOMETER

**Karl Betz, Dix Hills, N.Y., assignor to Theta Industries, Inc., Port Washington, N.Y.**

**Filed Sept. 3, 1974, Ser. No. 502,989**

**Int. Cl.[2] G01N** *25/16*

**U.S. Cl. 73—16** **3 Claims**




1. In combination with a dilatometer of the type using a linear, variable, differential transformer that includes an annular, axially elongated coil, an axially elongated displaceable core positioned within the coil and first and second pairs of leaf springs for resiliently and independently supporting the coil and the core, respectively, at opposite ends thereof; improved adjusting means for axially displacing the core relative to the coil independently of the supporting springs, said adjusting means comprising:

a. a non-magnetic sleeve mounted between a pair of said leaf springs, said core being slidably carried within said sleeve;

b. at least one internally threaded member secured to one of the leaf springs that support the core;

c. rod means having a first threaded rod portion mating with said internally threaded member and an end in engagement with one end of the core whereby rotation of said first threaded portion of said rod means relative to said internal threaded member causes axial displacement of the core within said sleeve relative to the coil; and

d. a spring positioned within said sleeve, said spring being interposed between the end of the core remote from said first threaded rod portion and said other core supporting leaf spring.

## 3,919,880

## METHOD AND APPARATUS FOR TESTING CLOSED-END TUBES IN HEAT EXCHANGERS OF NUCLEAR REACTORS AND THE LIKE

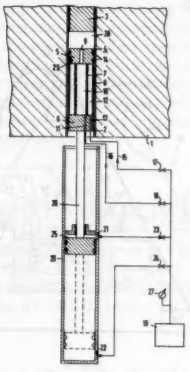
**Günter Seyd, Erlangen; Axel Bergbauer, Rosenbach, and Uwe Paulsen, Erlangen, all of Germany, assignors to Siemens Aktiengesellschaft, Munich, Germany**

**Filed June 9, 1972, Ser. No. 261,247**

**Claims priority, application Germany, June 9, 1971, 2128604**

**Int. Cl. G01m** *3/28*

**U.S. Cl. 73—49.8** **9 Claims**



**1.** An apparatus for testing the tightness of a tube, closed at one end, with a fluid under pressure, the tube being in a heat exchanger of a nuclear reactor or the like, the apparatus comprising a test stopper including a tubular outer jacket, front and back end-face members joined to respective longitudinal ends of said outer jacket to define a closed space bounded by said jacket and said end-face members, said front end-face member and the closed end portion of the tube defining a closed inner region of the tube when the stopper is inserted therein, an inner tubular member disposed within said outer jacket extending between said end-face members to partition said closed space into an annular outer chamber and a cylindrical inner chamber; pressure-fluid supply means connected to said stopper for selectively supplying fluid to said chambers; said inner tubular member being subjectable to forces developed by pressure and suction within said inner chamber, said outer jacket being thin-walled and expandable outwardly in response to fluid admitted under pressure to said annular chamber, thereby firmly seating the stopper against the inner wall of the tube to be tested, said front end-face member having a bore extending therethrough and communicating with said inner chamber to admit fluid under pressure from said inner chamber to the inner region of the tube; and insertion means connected to said back end-face member of said stopper for removably inserting the same into the tube.

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## 3,919,881

## TEMPORAL REFERENCE WAVEFRONT RECONSTRUCTION PROCESS AND SYSTEM

**Alexander F. Metherell, Newport Beach, Calif., assignor to McDonnell Douglas Corporation, Long Beach, Calif.**

**Continuation of Ser. No. 852,715, Aug. 25, 1969, abandoned. This application Dec. 27, 1971, Ser. No. 212,765**

**Int. Cl. G01n** *29/04*; **G01b** *9/00*

**U.S. Cl. 73—67.5 H** **60 Claims**

**1.** Apparatus operable with a substantially monochromatic coherent radiation source for producing interference patterns at a predetermined location, comprising the combination of:

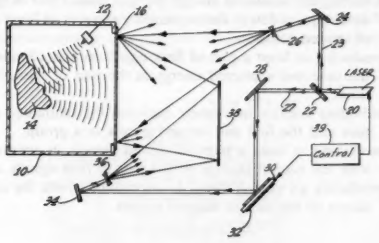
beam forming means for creating from the source an illuminating beam and a reference coherent therewith;

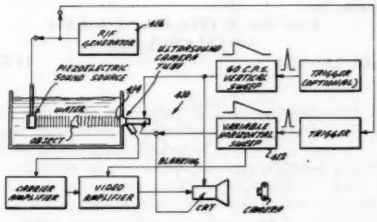
first means coupled to said beam forming means for directing said illuminating beam upon an object;

second means coupled to said beam forming means for directing said reference beam to the predetermined location;

phase shifting means interposed in the path of a one of said illuminating and reference beams for changing the phase thereof with respect to the other of said beams;

control means connected to said beam forming means and said phase shifting means for providing a first irradiation and a second irradiation subsequent to said first irradiation superimposed over and coextensive with said first irradiation, said phase shifting means introducing a relative change in phase as between said illuminating and reference beams in a second irradiation, said phase shifting means being operable to introduce up to a $\lambda/2$ shift, where $\lambda$ is the wavelength of the radiation source, for




producing first and second superimposed radiation patterns at the predetermined location.

**26.** Apparatus for producing a hologram of an object illuminated by coherent, monochromatic radiation of frequency $\omega$, comprising:

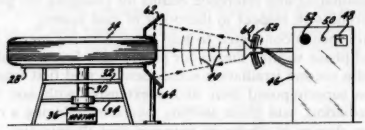
first means for linearly detecting at a first, detection plane the phase and amplitude of radiation scattered from the object and for generating signals representative of the radiation at each point in the plane and second means coupled to said first means for transmitting each of said signals substantially instantaneously, a recording plane, each point of which corresponds to a point in said detection plane and responsive to said second means, and for recording, at said recording plane, the substantially instantaneous value "$a$" of detected radiation amplitude at the detection plane at a predetermined time, $t$, where $a = A \cos(\omega t + \phi)$,

$A$ is the maximum amplitude of radiation and $\phi$ is the phase of the radiant wave with respect to $t$.

## 3,919,882
## TIRE INSPECTION APPARATUS AND METHOD

Donald R. Wells, 9452 Brynmar Drive, Villa Park, Calif. 92667

Filed Feb. 11, 1974, Ser. No. 441,146
Int. Cl.² G01M 17/02
U.S. Cl. 73—146 15 Claims



11. A method for detecting separations in laminated structures, including the following steps,

radiating energy toward the laminated structure to provide for the scattering of the energy and with the spatial distribution of the scattered energy in accordance with any separations within the laminated structure,

detecting the scattered energy using at least a pair of spaced detectors to detect the scattered energy at at least a pair of spaced positions,

producing at least a pair of first signals in accordance with the detected scattered energy at the pair of spaced positions,

providing relative movement between the laminated structure and the first and second means as a group,

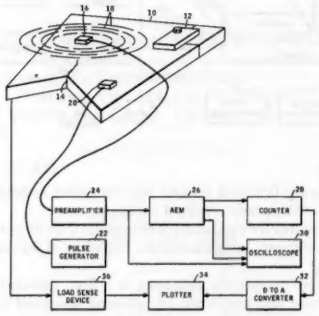
producing at least a pair of second signals in accordance with the rate of change of the pair of first signals, and

producing an output signal in accordance with the coincidence of the pair of second signals.

## 3,919,883
## METHOD AND APPARATUS FOR DETECTING PROGRESSIVE CRACKS IN MATERIALS

Yosio Nakamura, El Lago, and Charley L. Veach, Alvord, both of Tex., assignors to General Dynamics Corporation, Fort Worth, Tex.

Filed Mar. 5, 1974, Ser. No. 448,115
Int. Cl.² G01H 1/00
U.S. Cl. 73—71.4 11 Claims




1. An apparatus for detecting progressive cracks in a structure which comprises:

a sensor in contact with said structure, said sensor detecting acoustic pressure waves in said structure and producing corresponding electrical signals;

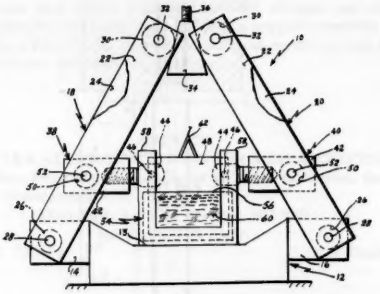
discriminator means receiving said signals to eliminate signals which rise to a selected amplitude in greater than a selected time period; and

output means for recording and examining signals which rise to said selected amplitude in less than said selected time period, whereby only those signals resulting from acoustic events in a region near said sensor reach said output means.

## 3,919,884
## HORIZONTAL LOADING FIXTURE FOR SUSTAINED LOAD TESTING

Allan W. Gunderson, Xenia, and Russell R. Cervay, Miamisburg, both of Ohio, assignors to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed Apr. 17, 1974, Ser. No. 461,673
Int. Cl.² G01N 3/08
U.S. Cl. 73—95 8 Claims

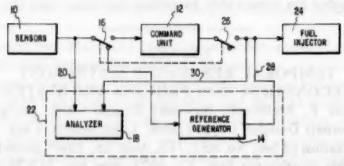


1. A horizontal loading fixture for sustained load testing of a specimen comprising a support member, a pair of lever arms, each of said lever arms being pivotally secured at one end thereof to said support member, means operably connected to the other end of each of said lever arms for moving said lever arms in a horizontal direction, means connected intermediate both ends of each of said lever arms for gripping said specimen and a container mounted on said support member surrounding said specimen and containing a preselected media therein, said gripping means protruding into said container but remaining outside of said preselected media whereby upon the application of a vertical force to said lever arm moving means a horizontal load is applied to said specimen.

## 3,919,885
## APPARATUS FOR DYNAMICALLY ANALYZING AN ELECTRONIC FUEL INJECTION SYSTEM AND THE ASSOCIATED ENGINE PARTS

Manfred Gustav Kaireit, West Palm Beach, Fla., assignor to Gerold J. Harbeke, Lake Worth, Fla.

Continuation of Ser. No. 237,828, March 24, 1972, abandoned. This application Jan. 31, 1974, Ser. No. 438,446
Int. Cl.² G01M 15/00
U.S. Cl. 73—119 A 46 Claims




1. Defect detecting apparatus for use with an internal combustion engine comprising

means for sensing at least the speed, load condition, and ambient temperatures of said internal combustion engine;

fuel injection means for injecting a variable amount of

fuel into the cylinder of said engine in response to at least one control signal;

control means for generating said control signal in response to said sensing means; and

defect detecting means responsive to said sensing means, said fuel injection means, and said control means for dynamically detecting predetermined defects within said sensing means, said fuel injection means, and said control means while said engine is running without interfering with the operation of said internal combustion engine, said sensing means, said fuel injection means and said control means, said defect detecting means including status indicating means responsive to said control signal applied to said fuel injection means for indicating the status of said fuel injection means or said control means, said status indicating means, in response to said control signal, indicating the presence of an open circuit or very high resistance in said fuel injection means and said status indicating means, in response to the absence of said control signal, indicating either the presence of a short circuit or very low resistance in said fuel injection means or a defect in said control means.

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**3,919,886**

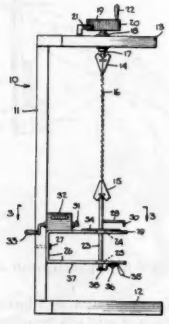
## METHOD AND APPARATUS FOR MEASURING YARN TWIST SET

**Phillip W. Chambley, Rome, Ga., assignor to Champion International, Stamford, Conn.**

**Filed June 11, 1974, Ser. No. 478,266**

**Int. Cl.[2] G01L** *5/04*

**U.S. Cl. 73—160** **8 Claims**



2. Apparatus for measuring twist set in yarn comprising in combination first means for mounting a length of yarn, means coupled thereto for manipulating said first means to untwist said yarn, means for releasing said first means for permitting said yarn to recover without significant restraint substantially all twist elastically retained therein, and means for providing an indication of the amount of twist so recovered.

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**3,919,887**

## LIQUID FLOW METER

**Karl Binder, Stuttgart, Germany, assignor to Firma Johann Baptist Rombach, Karlsruhe, Germany**

**Filed Apr. 22, 1974, Ser. No. 463,195**

**Claims priority, application Germany, Apr. 21, 1973, 2320568**

**Int. Cl.[2] G01F** *11/38*

**U.S. Cl. 73—251** **28 Claims**

1. A liquid flow meter, adapted particularly for the measurement of small volumes of liquid flow, as in pressure or suction-operated fuel feed systems, the flow meter comprising in combination:

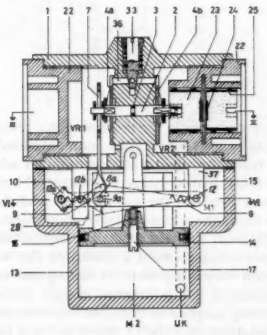
a closed housing assembly having a flow inlet side with an inlet port, a flow outlet side with an outlet port, and a cylinder housing portion with a cylinder bore;

a metering piston arranged inside the cylinder bore for free reciprocating motion therein, whereby the piston sealingly separates the cylinder housing into a first and a second metering chamber;

internal connecting channels adapted for separately linking the inlet side and the outlet side of the housing to both metering chambers;

a switching valve controlling the liquid flow through said internal connecting channels by selectively closing them in such a way that, in a first valve position, a connecting channel between the inlet side and the first metering chamber and another connecting channel between the outlet side and the second metering chamber are open, so that the metering piston moves in the direction toward the second metering chamber and, in a second valve position, a connecting channel between the inlet side and the second metering chamber and another connecting channel between the outlet side and the first metering chamber are open, so that the metering piston moves in the opposite direction;

a toggle mechanism connected to the switching valve in such a way that the two rest positions of the toggle mechanism determine, respectively, said first and second positions of the switching valve; and



means defined by the metering piston for actuating the toggle mechanism in response to the movement of said piston, as it reaches the end of its metering stroke;

each actuation of the toggle mechanism and connected switching valve being indicative of a given volume of liquid having passed through the flow meter, said actuation being interpretable as a flow rate by means of a counter; and

wherein the housing assembly further includes a valve housing portion with a transverse dividing wall separating its interior space into first and second valve chambers which communicate, respectively, with said first and second metering chambers; and wherein

the switching valve is a rotary disc valve, arranged in the dividing wall and including:

a central valve shaft being journalled in, and extending sealingly across said wall;

two valve discs rotatably connected to said shaft;

two oppositely facing parallel valve faces on the dividing wall; and

two valve channels extending across the dividing wall between said faces, and serving as said connecting channels, being connected to the inlet side and outlet side of the housing, respectively, each valve channel defining a valve port in each valve face, which port is openable and closable by one of the two valve discs, through rotation of the latter.

## 3,919,888
## GAUGE

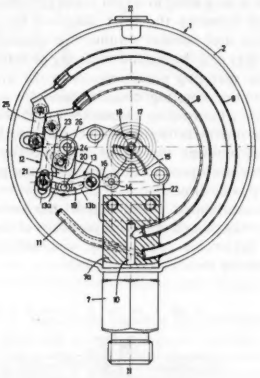
**Hans Ulrich Muster, Mulchi; Peter Kipfer, Jegenstorf; Peter Aebi, Burgdorf, and Hans Zwahlen, Hindelbank, all of Switzerland, assignors to Haenni & Cie. Aktiengesellschaft, Bern, Switzerland**

**Filed Apr. 9, 1974, Ser. No. 459,343**

**Claims priority, application Switzerland, Apr. 17, 1973, 5502/73**

**Int. Cl.[2] G01F** *23/14*

**U.S. Cl. 73—291** **4 Claims**



1. A diving-time gauge for indicating the remaining diving-time available to a diver at a given moment based upon his gas supply and his diving depth at that moment adhering to the formula C·(P/Q), with C being a constant, P being the differential pressure between the gas pressure and the water pressure, and Q being the water pressure plus 1, comprising a first measuring element exposed to the pressure differential P and a second measuring element exposed to the water pressure plus 1 Q, each measuring element having one end and a free end, each element being fastened at said one end, the free ends each being adapted to carryout movements corresponding to the variations of P and Q, respectively, a pointer mechanism to which movements are transmitted in a combination such that the turning of the pointer mechanism corresponds to the formula C·(P/Q), and a lever mechanism including a control lever, in which the two measuring elements are each fastened at said one end separately from one another, and the free end of the first measuring element is connected to the pointer mechanism via said lever mechanism, with a swivelling of the control lever corresponding to a certain movement of the free end of the first measuring element being influenced in its magnetude by the second measuring element.

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## 3,919,889
## ROTOR BALANCING APPARATUS

**Wallace F. Mitchell, Mettawa, Ill., assignor to Ammco Tools, Inc., North Chicago, Ill.**

**Filed Jan. 22, 1975, Ser. No. 543,025**

**Int. Cl.[2] G01M** *1/14*

**U.S. Cl. 73—485** **7 Claims**

1. Apparatus for statically balancing a rotor relative to the axis of rotation thereof, comprising

a generally U-shaped support having means connected thereto for hanging said support from above,

said support having an opening therein,

first pivot means carried by said support,

second pivot means pivotally supported by said first pivot means and including a balancer head positioned in the opening in said support,

level indicating means disposed at the top of said balancer head,

a rotor attachment removably mounted to said head below said first and second pivot means,

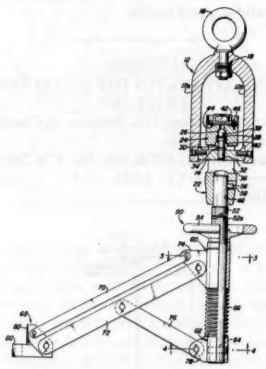
said rotor attachment comprising

an elongated spindle having an externally threaded upper portion,

an adjusting wheel positioned on said spindle in threaded engagement with said threaded upper portion,

a first sleeve slidably disposed on said spindle below said adjusting wheel,

a second sleeve fixedly connected to said spindle near the bottom thereof,



a plurality of equi-angularly spaced rotor centering and support jaws,

a plurality of sets of mutually parallel linkage arms,

the linkage arms in each of said sets being respectively pivoted at one end to said jaws and at the other end to said first sleeve,

a plurality of linkage arms each pivotally connected at one respective end to said second sleeve and at the other end to one of said sets of linkage arms, and

spring means urging said first sleeve upwardly against said adjusting wheel.

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## 3,919,890
## DOOR ACTUATOR

**James R. Workman, Lakewood, N.Y., assignor to Keeler Brass Company, Grand Rapids, Mich.**

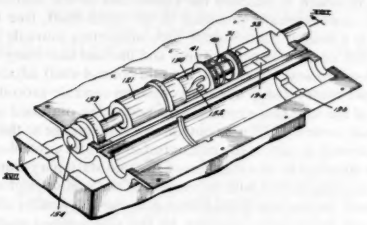
**Continuation of Ser. No. 352,250, April 18, 1973, abandoned. This application May 2, 1974, Ser. No. 466,294**

**Int. Cl. F16h** *27/02*

**U.S. Cl. 74—89** **25 Claims**

1. An actuator assembly for converting a linear movement to a rotational movement comprising: a plunger rod; means for producing axial movement of said plunger in both axial directions; camming means associated with said plunger rod to produce alternating clockwise and counterclockwise rotational movement of one of said plunger rod and said camming

means; and means for alternating the direction of said rotational movement of said one of said plunger rod and said



camming means after each cycle of axial movement of said plunger rod.

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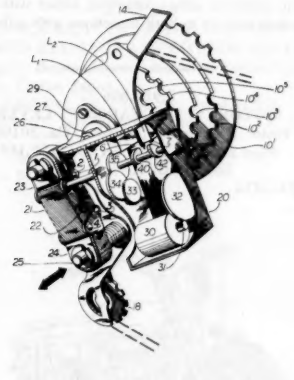
3,919,891

## ELECTRICAL GEAR CHANGER FOR CHAIN DRIVEN VEHICLE

**Brian J. Stuhlmuller, 740 Fairfield Road, Glenside, Pa. 19038, and Paul Zakarian, 3302 Windsor Drive, Norristown, Pa. 19403**

**Filed Oct. 15, 1973, Ser. No. 406,690**
**Int. Cl.[2] F16H** *9/00*; **F16D** *11/04*
**U.S. Cl. 74—217 B** **19 Claims**



**1.** The method of changing the gear ratio in a velocipede utilizing an electrically driven gear changer comprising the step of

a. energizing said electrically driven gear changer to cause the gear ratio to be changed.

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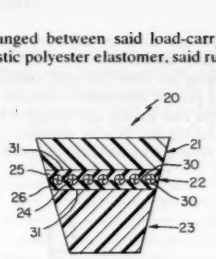
3,919,892

## ENDLESS POWER TRANSMISSION BELT STRUCTURE

**David G. Ballou, Ozark, Mo., assignor to Dayco Corporation, Dayton, Ohio**

**Filed Aug. 12, 1974, Ser. No. 497,002**
**Int. Cl.[2] F16G** *1/00, 5/00*
**U.S. Cl. 74—231 P** **20 Claims**

**1.** An endless power transmission belt structure comprising, load-carrying means, a thermoplastic polyester elastomer on at least one side of said load-carrying means, and a rubber compound arranged between said load-carrying means and said thermoplastic polyester elastomer, said rubber compound



assuring the provision of a tenacious bond between said thermoplastic polyester elastomer and said load-carrying means.

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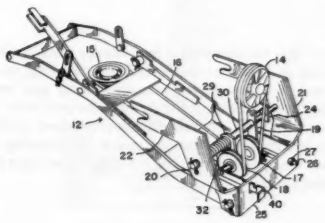
3,919,893

## MULE DRIVER IDLER LOCKOUT DEVICE

**Rudolph A. Boehm, Downers Grove; Gerald N. Borchardt, Hinsdale, and Wayne A. Zahlit, Westmont, all of Ill., assignors to International Harvester Company, Chicago, Ill.**

**Filed July 12, 1974, Ser. No. 488,131**
**Int. Cl.[2] F16H** *1/10*
**U.S. Cl. 74—242.15 R** **11 Claims**



**1.** In a mule driven apparatus for an implement mounted on a garden tractor, said mule drive including a drive sheave on the tractor, a driven sheave on the implement, a frame means, first and second idler sheaves mounted through means to said frame means, an endless belt operatively disposed about said sheaves, said first idler sheave being movable between a position tensioning said belt and a position operatively disengaged from said belt, spring means biasing said first idler sheave to said tensioning position, and adjustable means connecting said second idler sheave to said frame means for regulating the tension on said belt, the improvement comprising an idler sheave lockout bar connected to said means mounting said first idler sheave and disposed to overcome said spring means to place said first idler sheave in said operatively disengaged position while maintaining the adjustment on said adjustable tension regulating means, said idler sheave lockout bar extending adjacent portion of said frame means, and shoulder means on said lockout bar disposed thereon to engage said portion of said frame means to maintain said idler sheave in said lockout position.

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3,919,894

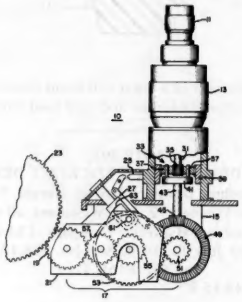
## PRE-ENGAGEMENT TURNING GEAR

**Raleigh F. Keeter; Francis D. Ryan, both of Schenectady; Kenneth V. Wellner, Ballston Spa, all of N.Y., and Gerhard A. Nickstadt, Oakland, N.J., assignors to General Electric Company, Schenectady, N.Y.**

**Filed Sept. 30, 1974, Ser. No. 510,217**
**Int. Cl.[2] F16H** *35/00, 57/00*; **F02G** *3/00*
**U.S. Cl. 74—384** **7 Claims**

**1.** An improved turning gear apparatus for rolling a turbomachine rotor by selectively engaging a bull gear on the turbomachine rotor; the turning gear apparatus of the type includ-

ing a stationary frame mounted adjacent the rotor bull gear; a carriage pivotally mounted to the frame including a first pinion, for engaging the rotor bull gear, rotatably mounted on the carriage and pivotal therewith; a second pinion continuously engaging the first pinion and mounted to the frame, the second pinion having an axis of rotation coaxial with the carriage axis of rotation; means for selectively positioning the



carriage so that the first pinion may engage the rotor bull gear; a gear train mounted to the frame and engaging the second pinion; and, a relatively large, main turning gear motor for rolling the turbomachine rotor through the gear train and first and second pinions, wherein the improvement comprises a relatively small pre-engagement motor for climbing the first pinion into engagement with the rotor bull gear prior to rolling the turbine rotor.

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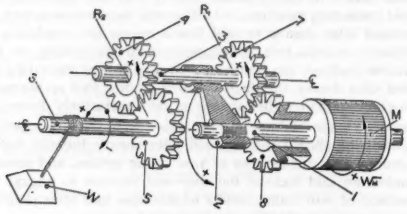
**3,919,895**

## VARIABLE OUTPUT TRANSMISSION

**John Hugh Kerr, Kitchener, Canada, assignor to Ker-Train Systems N.V., Curacao, Netherlands Antilles**

**Filed Sept. 11, 1974, Ser. No. 505,110**
**Claims priority, application Canada, Sept. 26, 1973, 182000**
**Int. Cl.² F16H** *35/02, 1/28*
**U.S. Cl. 74—394** **19 Claims**



**1.** An infinitely-variable-transmission consisting of a plurality of inverted gear-train-loops that share a common first and last gear-elements, with each said loop incorporating a square-wave-generator such that the said last gear-element is the common driven-take-off-gear of the loops with the said first gear-element the common variable-ratio-driver-gears of the said generators and the reactive-element of the transmission, with the differential-assemblies of the said generators mounted in a rotatable center-spool with their axies parallel to and evenly spaced around the common axis to the said common first and last elements, with the said last element of the loops attached to the output-shaft of the transmission with supporting-journals in the front disk of the said center-spool and a concentrically-mounted column variable-ratio-driver-gear of the said first element, with the said common driver-gear affixed to the stationary-transmission-housing; coaxially-mounted in the transmission with the output-shaft is the input-shaft to which is attached the center-disk of the said center-spool; concentrically mounted to the input-shaft, free to rotate, is a hollow control-shaft with supporting-journals in the rear disk of the said center-spool and the said stationary-transmission-housing; attached to the said control-shaft adjacent to the said center-disk is a second common variable-ratio-driver-gear of the said first element; attached to the outboard end of the said control-shaft is a control-arm with linkage to the body of a control-actuator; the piston-rod of the said control-actuator is attached to an extension of the said stationary-transmission-housing so that with movement of the said control-actuator-body on the said fixed-piston-rod, the reference-radius of the said driver-gear attached to the said control-shaft will rotate, through a limited arc, relative to the reference-radius of the said driver-gear attached to the said stationary-transmission-housing, thereby, changing the relative phase-angle in the linear-sawtooth rotational-patterns of their congruent variable-ratio-driven-gears attached to the said differential-assemblies, so that with constant rotation of the input-shaft and attached center-spool, the relative velocities of the said driven-gears are integrated by the differential-gear-trains of the said driven-gears are integrated by the differential-gear-trains of the said generators, within the limits imposed by the action of the overrunning-clutches and subject to the conservative-field-force, so that the kinematic-ratio between the common first and last elements of the said plurality of inverted-gear-train-loops can be made to vary infinitely, within a finite range that is subject to the controllable relative-angle between the reference-radii of the said driver-gears and the fixed-ratio of the take-off gears, with the finite range of kinematic-ratio such that the output-shaft of the transmission can be made to rotate in either direction, either with or without infinite translation; or in both directions with infinite translation.

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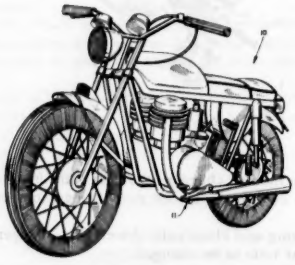
**3,919,896**

## MOTORCYCLE GEARSHIFT LEVER

**Owell G. Foster, P.O. Box 28, Bowdon, Ga. 30108**

**Filed June 13, 1974, Ser. No. 479,165**
**Int. Cl.² G05G** *1/14, 9/12*
**U.S. Cl. 74—474** **8 Claims**



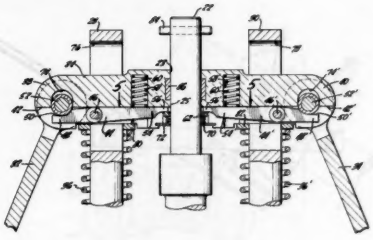
**1.** A foot actuated gearshift for a motorcycle comprising a lever rigidly connected at one of its ends to a laterally extending rotatable shaft for pivotal movement with said shaft, a foot pedal projecting laterally from the distal end portion of said lever for downward force by a foot to pivot the lever downwardly about the axis of said shaft, and a toe pedal mounted on said lever above said foot pedal and projecting laterally with respect to said lever over said foot pedal for upward force by the foot to pivot the lever upwardly about the axis of said shaft.

3,919,897

## CONTROL LINE REGULATOR SURGE LOCK ASSEMBLY

Elmer Chensheng Yang, Anaheim, Calif., assignor to Pacific Scientific Company, Anaheim, Calif.

Filed Jan. 14, 1974, Ser. No. 433,249
Int. Cl.[2] F16C *1/10*
U.S. Cl. 74—501.5 R 15 Claims



1. A surge lock assembly comprising:
a lock shaft;
a crosshead slidably mounted on said lock shaft;
a pair of control cables connected under tension to said crosshead for operating a control element;
means for locking said crosshead on said lock shaft responsive to a surging release of said tension in one of said control cables and for maintaining said locked position of said crosshead when said tension in the other of said control cables is eliminated.

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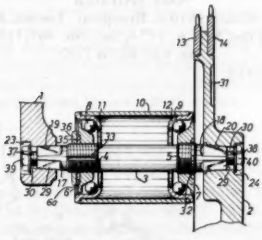
3,919,898

## ADJUSTABLE BICYCLE CRANK ASSEMBLY WITH PRELOADED BEARINGS AND COTTERLESS CRANKS

Yasushi Sugino, Ikoma, Japan, assignor to Sugino Cycle Industries, Ltd., Osaka, Japan

Filed Dec. 20, 1973, Ser. No. 426,556
Claims priority, application Japan, Mar. 13, 1973, 48-32161
Int. Cl.[2] F16C *13/06*, *9/00*, *25/06*
U.S. Cl. 74—594.2 2 Claims



1. A driving assembly for a bicycle comprising a bracket axle provided with screw rods positioned at opposite ends thereof, tapered portions having planar portions positioned inwardly of each said screw rod and threaded portions positioned inwardly of said tapered portions, said screw portions having grooves therein extending in the axial direction; washers mounted on the screw portions of said bracket axle, said washers having a projection thereon which engages the grooves in said bracket axle, thereby preventing the rotation of said washers relative to said bracket axle; nuts screwed onto the threaded portion of said bracket axle for holding said washers and race members in fixed positions thereon; ball retainers opposing said race members and cooperative therewith to retain balls betwen said ball retainers and said race members; an axle housing holding said ball retainers and rotatably supporting said bracket axle therein; right and left cranks each having at its head a tapered hole for receiving said tapered portion of said bracket axle and a recess communicating with the tapered hole, the tapered hole being defined by planar surfaces fittingly engageable with the planar surfaces of said tapered portion, wherein said tapered portions of said bracket axle are fitted in said tapered holes of the right and left cranks such that said axle and cranks are rotatable together and said screw rods of said bracket axle are positioned in said recesses in the cranks, said bracket axle and said right and left cranks being fastened together by nuts inserted into the recesses and screwed onto the screw rods; and at least one sprocket fixed to one of said cranks.

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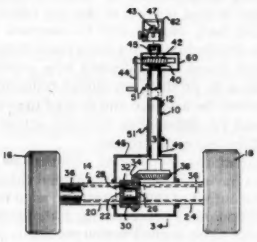
3,919,899

## SELF ALIGNING PLANETARY GEAR DIFFERENTIAL

Bruce H. Parker, Jr., 1000 Paradise Road, Swampscott, Mass. 01907

Filed Dec. 5, 1973, Ser. No. 422,016
Int. Cl. F16h *1/40*, *1/44*
U.S. Cl. 74—713 21 Claims



1. A continuous self-aligning planetary gear differential axle assembly comprising, a pair of spaced aligned hollow axles, the axles terminating inwardly in spaced opposed axle gears, at least one planetary gear sized and positioned to engage both axle gears in a planetary assembly, a continuous floating central shaft passing axially through both said hollow axles and said planetary gear assembly for strengthening and maintaining the alignment of said differential axle assembly and ring drive means connected to said planetary gear and rotatably mounted around said central shaft.

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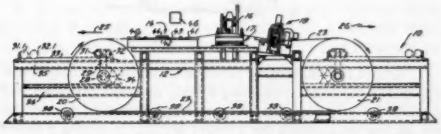
3,919,900

## AUTOMATIC ROLL TENSIONING METHOD AND APPARATUS

Francis Edwin Allen, North Vancouver, and Andrew Wilkinson Porter, Vancouver, both of Canada, assignors to Letson and Burpee Ltd., Vancouver, Canada

Filed Dec. 9, 1974, Ser. No. 530,875
Int. Cl.[2] B23D *63/18*
U.S. Cl. 76—27 15 Claims



1. An apparatus for automatically roll tensioning a saw having a longitudinal axis and an effective width defined by space between edge data of the saw, the saw being adapted to be fed along the longitudinal axis, the device including:

i. support means to mount the saw to permit movement of the saw along the longitudinal axis,

ii. blade forming means adapted to form a selected portion of the saw into a known curve, existing pre-stress distribution in the saw causing the selected portion of the saw to bow across the width thereof relative to a face datum to assume a bowed profile,

iii. bow detecting means adapted to detect bow of the selected portion of the saw relative to the face datum, the detecting means having an output responsive to position of the saw face relative to the edge and face data so as to reflect existing pre-stress distribution local to the selected portion of the saw based on the actual saw profile at that portion;

iv. a back crown gauge cooperating with one edge of a portion of the saw so as to measure back crown at that portion of the saw, the back crown gauge including a back crown sensor having an output reflecting back crown of the saw,

v. a computer having an input connected through an interface to the outputs of the bow detecting means and the back crown gauge, the output from the back crown gauge being synchronized with the output from the bow sensing means for that particular portion of the saw; the computer being programmed to assess existing pre-stress distribution in that portion of the saw based on the bow profile and back crown, and to compare the assessed pre-stress distribution with a theoretical desired pre-stress distribution based on a desired bow profile and back crown, so as to produce an output reflecting the difference between the assessed and desired pre-stress distributions based on differences between actual and desired bow profiles and back crowns,

vi. tensioning means cooperating with the saw, the tensioning means having an output connected through an interface to the output of the computer so as to receive signals from the computer representing a particular degree of rolling force to be applied to that particular portion of the saw, at a position on the saw relative to the edge data, so as to change the existing pre-stress distribution in the saw to approach the desired pre-stress distribution.

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**3,919,901**

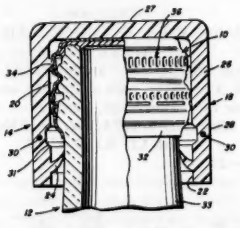
**TOOL FOR FACILITATING REMOVAL OF SCREW-CAP BOTTLE CLOSURES**

**John R. Braman, 7 Meadow Circle, Athens, Ga. 30025**

**Filed Dec. 16, 1974, Ser. No. 533,085**

**Int. Cl.[2] B67B 7/18**

**U.S. Cl. 81—3.4** **8 Claims**



1. A tool for facilitating removal of a conventional screw-cap bottle closure, comprising a body member provided with a recess forming a socket for receiving the closure, and including means for gripping the closure the recess having a mouth arranged for permitting reception of a closure in the recess said body having a sealing lip arranged immediately adjacent the mouth thereof for sealingly engaging the bottle associated with the closure and preventing leakage down an outer surface of the bottle.

**3,919,902**

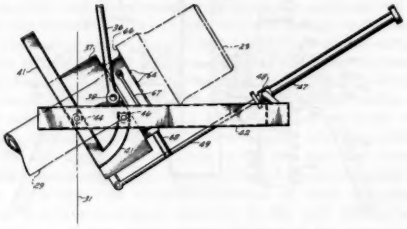
**APPARATUS FOR SUSPENDING AND SPINNING PIPE**

**Charles R. Johnson, San Pedro, Calif., assignor to Global Marine, Inc., Los Angeles, Calif.**

**Filed June 13, 1974, Ser. No. 478,931**

**Int. Cl.[2] E21B 19/06**

**U.S. Cl. 81—57.16** **13 Claims**



1. A pipe supporting spinner for travelling along a vertical rail system in a derrick and supporting and spinning a heavy pipe comprising:

a travelling frame including means for guiding engagement with a vertical guide rail;

a U-shaped support block;

means for mounting the support block in the frame for pivoting about a horizontal axis transverse to the opening of the U;

an actuator for controllably pivoting the support block between a first position with the opening of the U facing horizontally and a second position with the opening of the U tilted upwardly;

a thrust bearing on top of the support block for receiving the weight of the pipe and permitting free rotation thereof;

means on the support block for releasably securing a pipe in the opening of the U transverse to the pivot axis; and

means on the support block for engaging the outside of a pipe and imparting axial rotation thereto.

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**3,919,903**

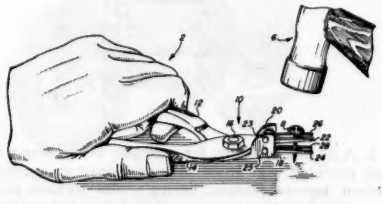
**NAIL HOLDER**

**Edgar O. McAlister, 9810 E. Broadway, Tucson, Ariz. 85710**

**Filed May 6, 1974, Ser. No. 467,111**

**Int. Cl.[2] B25B 7/02**

**U.S. Cl. 81—419** **3 Claims**



1. Holding apparatus, comprising in combination:

a first handle having a first side plate secured thereto;

a second handle having a second side plate secured thereto, said first and second handles secured together and movable relative to each other;

finger means, comprising a plurality of fingers pivotally secured to the first and to the second side plates and each finger movable on the side plates relative to the other fingers, for holding a member therebetween in response to an inwardly directed force on the handles.

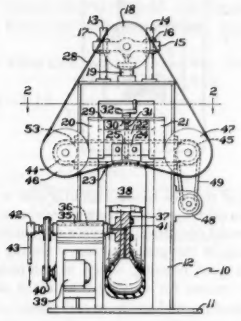
## 3,919,904
## TIRE TRUING MACHINE

**Mathew Kuts, Akron, Ohio, assignor to The B. F. Goodrich Company, Akron, Ohio**

**Continuation of Ser. No. 237,369, April 5, 1972, abandoned. This application Jan. 18, 1974, Ser. No. 434,500**

**Int. Cl.[2] B23B** *1/00, 5/14*

**U.S. Cl. 82—47** **12 Claims**



**1.** The method of truing a tire comprising the steps of rotating a chucked tire about its central axis of rotation, rotating an endless band saw in an orbital path; guiding a portion of said band saw in its rotation through arcuately shaped contour of a crown profile of a tire to selectively trim across the full face of said tire as it is rotated past said band saw.

**4.** A tire truing machine comprising support means, chuck means mounted on said support means for supporting a tire for rotation about a central axis, motive drive means connected to said chuck means for rotating said chuck means and a tire mounted thereon about said central axis, a circular endless band saw mounted on said support means, drive means connected to said band saw for driving said band saw through an orbital path, tool support means mounted on said support means, said tool support means having an arcuately shaped recess whose curvature is concentric to the adjacent cross-sectional outer crown portion to a tire held by said chuck means and being operative to guide said band saw in a portion of its path to trim the outer peripheral surface of a tire as it is held and rotated by said chuck means.

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## 3,919,905
## PAPER DISPENSER

**Paul D. Hoffman, 11 Englewood Ave., Brookline, Mass. 02146**

**Continuation of Ser. No. 728,106, May 9, 1968, abandoned, which is a continuation-in-part of Ser. No. 538,809, March 30, 1966, abandoned. This application June 1, 1971, Ser. No. 148,928**

**Int. Cl.[2] B26D** *7/02*

**U.S. Cl. 83—205** **25 Claims**

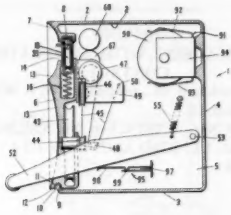
**1.** A dispenser for feeding and severing segments of sheets from a roll of sheet material such as towels or the like comprising,

a cabinet having opposite side walls and longitudinally extending walls including a front wall, means forming an elongated passage at said front wall, means positioned intermediate said side walls for supporting a roll of sheet material on its axis with the leading edge adapted to project through said elongated passage,

means pivotally securing said front wall along one edge thereof to one of said longitudinally extending walls with said passage formed between said front wall and a longitudinally extending wall,

an electric motor means connecting said motor to said roll-supporting means for rotating said roll and feeding said sheet through said passage,

a cutting element comprising a blade having an upwardly projecting edge, a block supporting said blade, a longitudinally extending guide bar supported at said front wall for guiding said block across said dispenser,



a lever, means interengaging said lever with said motor and said cutting element whereby actuation of said lever causes sequential operation of said motor and said cutting element,

means for actuating said motor in response to movement of said lever in one direction and means for actuation of said cutting element in response to movement of said lever in a second direction, and

means for stopping said motor on movement of said lever from a motor-actuating position in said second direction.

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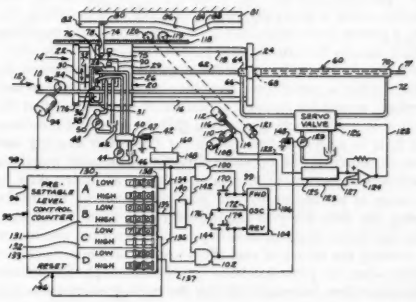
## 3,919,906
## ELECTROHYDRAULICALLY CONTROLLED CUT OFF SAW

**Anthony G. Law, East Cleveland, Ohio, assignor to Chase Brass and Copper Co., Cleveland, Ohio**

**Filed Apr. 24, 1974, Ser. No. 463,771**

**Int. Cl.[2] B23D** *25/04, 25/16, 45/22*

**U.S. Cl. 83—294** **4 Claims**




**3.** A cut off saw for cutting continuously moving stock traveling at a high rate of speed comprising: a carriage movable along the path of travel of the stock; a saw mounted on the carriage for transverse movement to cut the stock; a hydraulic cylinder for accelerating, decelerating, and moving the carriage in a forward direction, the same as the direction of travel of the stock, and in a reverse direction opposite to the direction of travel of the stock; control means for controlling the flow of hydraulic fluid from the source to the cylinder to control the movement of the carriage; means for traversing the carriage to cut the stock during forward movement of the carriage and comprising, a cam extending along the path of

travel of the carriage, a follower pivotally connected to said carriage, latch means for latching the follower rigid with carriage to cause the cam and follower to traverse the carriage, and means to enable the latch means to latch the follower so the follower and cam traverse the carriage and cut the stock during forward movement of the carriage; and means to disable the latch means to permit the follower to pivot with respect to the carriage during reverse movement of the carriage, so traverse is eliminated during reverse travel of the carriage.

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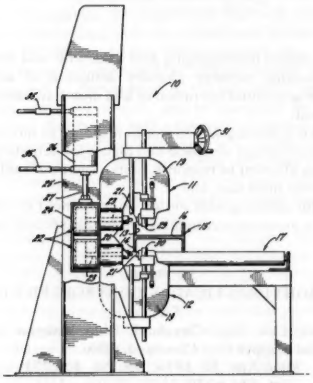
**3,919,907**

## PUNCHING MACHINE WITH AUTOMATIC CYCLE CONTROL

**Lee Kindgren, Rockford, Ill., assignor to W. A Whitney Corporation, Rockford, Ill.**

**Filed Nov. 4, 1974, Ser. No. 520,362**
**Int. Cl.² B26D *5/02*; B26F *1/14***
**U.S. Cl. 83—368** **6 Claims**



1. Apparatus for punching holes in an elongated member, said apparatus comprising a conveyor for advancing said member along a generally horizontal path to a punching station, a punch press supported for movement in said punching station, means for causing said press to advance in one direction from a home position and for stopping said press when the latter reaches a preselected punching position relative to said member, means for causing actuation of said press when the latter is in said punching position thereby to effect punching of a hole in said member, means for thereafter causing said press to return in the opposite direction from said punching position at substantially the same velocity as undertaken by the press in advancing to said punching position, means for storing the time interval required for said press to advance from said home position to said punching position, and means for causing the return of said press toward said home position to stop when the press has been returned through the substantially same time interval whereby the press is stopped in said home position.

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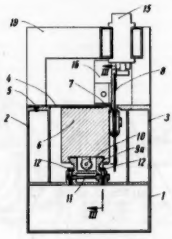
**3,919,908**

## METAL COLD SAW

**Leopold Jaegers, Rudolf-Diesel-Str. 1, 535 Euskirchen, Germany**

**Filed Nov. 12, 1973, Ser. No. 415,171**
**Claims priority, application Germany, Nov. 11, 1972, 2255347**
**Int. Cl.² B26D *1/14*; B27B *5/18***
**U.S. Cl. 83—471.2** **4 Claims**

1. A metal cold saw, whose circular saw blade together with its gear housing can move forward, under and along a metal plate fixed firmly to a machine frame, in the direction of cutting towards a workpiece held on the machine frame of the metal cold saw, the metal plate serving to support the workpiece and transmit the cutting forces, the gear housing having, on its surface transverse to and near the saw blade, a supporting surface for the metal plate, which plate has a thickness



smaller than 1% of the saw blade diameter and is so thin that it would be deformed by the cutting pressure in a way that would hinder normal operation if it were not supported on the supporting surface of the gear housing, a sliding guide being provided for the gear housing which is independent of the metal plate, and means for varying the height of the sliding guide in a direction normal to the metal plate.

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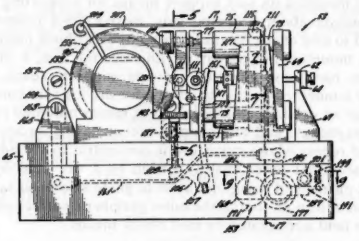
**3,919,909**

## PRESS WITH ADJUSTABLE STROKE

**Eldred D. Scott, Tustin, Calif., assignor to Precision Sales Corporation, Reno, Nev.**

**Division of Ser. No. 402,290, Oct. 1, 1973, Pat. No. 3,863,534.**
**This application Dec. 9, 1974, Ser. No. 531,146**
**Int. Cl.² B26F *1/02***
**U.S. Cl. 83—530** **8 Claims**



1. A press for performing a work operation on material comprising:
- a supporting structure;
- a platen adapted to carry a first tool;
- first and second shafts connected to said platen;
- bearing means for supporting said shafts on the supporting structure for reciprocatory movement whereby the platen and the first tool can be reciprocated;
- a connecting member connected to said first and second shafts;
- a yoke having first and second arms, said arms being spaced apart;
- means for mounting said yoke on said connecting member for pivotal movement about a pivot axis;
- first and second cam followers carried by the first and second arms, respectively;
- first and second rotatable cams mounted on the supporting structure and cooperable with said first and second cam followers to drive said connecting member whereby the first tool is driven;

means for adjusting the angular position of the yoke about said pivot axis relative to said connecting member whereby the positions of both of said cam followers relative to said connecting member can be accurately and simultaneously adjusted to thereby make an adjustment in the stroke of the first tool; and

means for holding a second tool in a position to cooperate with the first tool whereby the tools can perform a work operation on said material.

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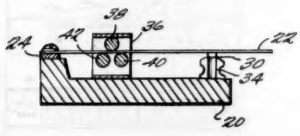
**3,919,910**

## ELECTRONIC BASS INSTRUMENT

**Robert H. Rust, 1073 Hampton Road, Daytona Beach, Fla. 32014**

**Filed Oct. 21, 1974, Ser. No. 516,814**
**Int. Cl.² G10H** *3/08*
**U.S. Cl. 84—1.15** **5 Claims**




1. An electronic vibrating musical pick-up comprising

a base plate having means defining a groove extending thereon,

a metal, flexible reed attached at one end to said plate for vibratory movement and extending above said groove with the other end free,

a magnet mounted on said other end,

control means movable along said groove and engaging said reed so that the distance between said other end of said reed and the point of engagement controls the frequency of said vibratory movement, including a frame member having an opening therethrough through which said reed extends, at least one roller mounted for rotation in said frame member and engaging the upper surface of said reed for rolling movement along said reed, and at least one roller mounted for rotation in said frame member and engaging the underside surface of said reed for rolling movement along said reed, said rollers pinching said reed between them and the axes of rotation of said rollers extending parallel to the plane of the reed upper and underside surfaces, and

magnetic pick-up means mounted on said plate adjacent said other end for producing an electrical signal as the free end of said reed vibrates and said magnet moves past said pick-up means.

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**3,919,911**

## SYSTEM AND APPARATUS FOR SIMULTANEOUS CONTROL OF THE LEVELS OF SIGNALS BEING FED ALONG SEPARATE PATHS

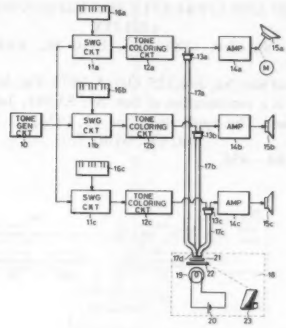
**Akira Nakata, 4414 Tsuboi-cho, and Hiroshi Amano, 1923-60 Nishijama-cho, both of Hamamatsu, Japan**

**Division of Ser. No. 357,062, May 3, 1973, abandoned. This application Nov. 29, 1974, Ser. No. 528,468**
**Claims priority, application Japan, July 6, 1972, 47-80485**
**Int. Cl.² G10H** *1/02, 5/00*
**U.S. Cl. 84—1.27** **7 Claims**

1. In an electronic musical instrument of the type comprising a plurality of keyboards, a plurality of tone coloring circuits provided correspondingly to said respective keyboards, each of said tone coloring circuits being adapted to impart a desired tone color to an electrical signal delivered thereto from a tone generator circuit each time any of the keys of the corresponding one of said keyboards is depressed, and a plurality of amplifier circuits the inputs of which are connected to the outputs of said respective tone coloring circuits and the outputs of which are connected to a plurality of loudspeakers respectively, an expression control system comprising:

light source means;

a plurality of light-sensitive variable resistors connected between said tone coloring circuits and said amplifier circuits respectively, said light-sensitive variable resistors being caused to offer variable electrical resistance to the passage therethrough of the output signals from said respective tone coloring circuits by being supplied with




the light of variable intensity from said light source means;

a plurality of optical fibers adapted to direct the light from said light source means to said respective light-sensitive variable resistors by internal reflection; and

means for regulating the intensity of the light directed from said light source means to said light-sensitive variable resistors by said respective optical fibers to cause the corresponding change in the volume of the sounds emitted from said loudspeakers.

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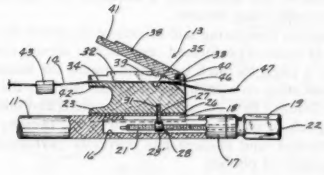
**3,919,912**

## MUSICAL INSTRUMENT BOW FROG

**Myron E. Darling, 515 Ohio St., Webster City, Iowa 50595**

**Filed July 18, 1974, Ser. No. 489,822**
**Int. Cl.² G10D** *1/02*
**U.S. Cl. 84—282** **6 Claims**




1. A musical instrument bow having a rod, a tip unit at one end of the rod, a frog unit at the other end of the rod, and hair adapted to be held by and extended taut between the tip unit and the frog unit, means for moving the frog unit longitudinally of the rod relative to the tip unit, the improvement involving the frog unit and comprising:

a frog body having a cavity formed lengthwise therein for receiving the hair, said frog body having a front end and a rear end; and

a cover pivotally connected to said body whereby a passage is formed between said body and said cover pivotal connection, said cover having a raised position and a closed position;

said cavity adaptable to receive the hair therein whereby the hair extends completely through said cavity and past said

body rear end when said cover is in said raised position; the entire portion of the hair at said frog unit clamped between said body and said cover when said cover is in the closed position to thereby hold the hair in an immovable position with respect to the frog body in said closed position whereby said hair is exposed at the rear end of said body for cutting purposes.

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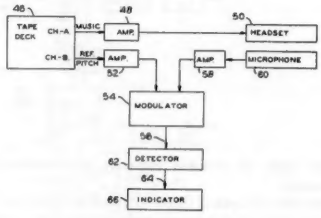
### 3,919,913
### METHOD AND APPARATUS FOR IMPROVING MUSICAL ABILITY

**David L. Shrader, 11810 NE. 141st St., Kirkland, Wash. 93033**

**Division of Ser. No. 294,525, Oct. 3, 1972, Pat. No. 3,808,936, which is a continuation of Ser. No. 53,081, July 8, 1970, abandoned. This application Apr. 15, 1974, Ser. No. 460,781**
**Int. Cl.[2] G10G** *7/02*
**U.S. Cl. 84—454** **2 Claims**




1. An apparatus for ascertaining the correctness of a student's pitch, comprising:

means for generating a musical sequence and audibly presenting it to said student;

means for generating a reference sequence of electrical signals corresponding to a sequence of pitches representative of a desired student's response to said audible musical sequence, said reference sequence and said musical sequence being simultaneously generated such that said reference sequence and said musical sequence are properly time related to provide a correct performance of said musical sequence and said reference sequence;

means for receiving a sequence of pitches performed by said student and generating a sequence of electrical signals corresponding thereto;

means for comparing said reference sequence of signals and said student performed sequence of signals continuously on a pitch by pitch basis; and means for instantaneously indicating on a pitch by pitch basis whether the frequency difference between said student signals and said reference signals is within predetermined limits, thereby indicating whether said student has correctly performed said sequence of pitches.

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### 3,919,914
### KEYBOARD INSTRUMENT HAND COORDINATION TRAINER

**Verna M. Leonard, 8701 Highway 41, Fresno, Calif. 93721**

**Filed Jan. 29, 1975, Ser. No. 545,207**
**Int. Cl.[2] G09B** *15/02*
**U.S. Cl. 84—474** **8 Claims**

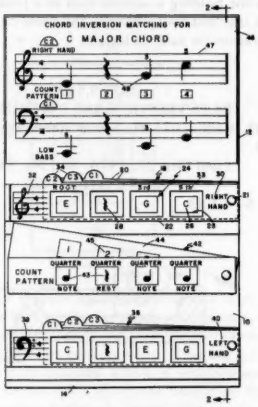
1. A hand coordination aid for keyboard instrument students comprising:

a. a planar panel;

b. two groups of selectively exposable horizontally extended strips secured to said panel, one of said groups being spaced above the other of said groups;

c. said strips each having thereon a longitudinal array of incrementally spaced indicia denoting at least some of the names of the scale tones of a chord and having indicia identifying the chord;

d. said coordination aid having indicia identifying one of said groups of strips with the left hand and the other of said groups with the right hand, whereby a student can




play the scale tones denoted on the exposed strip of one of said groups with one hand and simultaneously play the scale tones of the exposed strip of the other of said groups with the other hand to develop coordination between the left and right hands.

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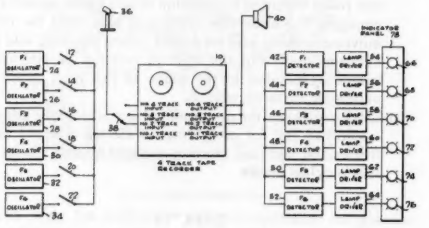
### 3,919,915
### ELECTRONIC MUSICAL CONDUCTOR

**Robert W. Isbell, 19001 Milford Circle, Huntington Beach, Calif. 92646**

**Filed Mar. 28, 1974, Ser. No. 455,711**
**Int. Cl.[2] G11B** *27/32*
**U.S. Cl. 84—484** **4 Claims**




1. A method of rendering a second musical performance in synchronism with the playback of a recorded first musical performance comprising the steps of:

recording the first musical performance as said first performance occurs;

generating a sequence of signals simultaneously with the occurrence of each measure of said first performance, each sequence of signals comprising an ordered set of signals uniquely associated with the order and timing of the beats in each measure as performed;

recording said sequence of signals simultaneously with said recording of said first performance;

playing back said recorded first performance and said sequence of signals simultaneously;

providing an ordered set of indicators to be sensed by the performer of said second musical performance, each of said indicators being actuated by said played back ordered set of signals, whereby each of said indicators is

associated with a particular beat of each measure of said first performance; and

rendering said second performance having beats therein in synchronism with said actuated indicators, whereby the beats of said second performance are in synchronism with the order and timing of the corresponding beats of said first performance.

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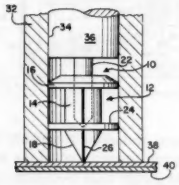
**3,919,916**

## DRIVE RIVET ASSEMBLY

**John Bert Alexander, Hoffman Estates, Ill., assignor to Illinois Tool Works Inc., Chicago, Ill.**

**Filed Sept. 12, 1974, Ser. No. 505,399**
**Int. Cl.[2] F16B** *13/06*
**U.S. Cl. 85—68** **11 Claims**




**1.** A rivet assembly capable of being driven, piercing a workpiece and set in a single operation, the assembly including a body member with a shank, a work engaging head at one extremity thereof and a work penetrating means at the other extremity, the body having a bore extending axially from the head toward the work penetrating means and terminating with driving and camming surfaces, the body including means weakening the body in a longitudinal direction thus permitting the body to be radially expanded at a predetermined driving force, the weakening means extending from the work penetrating means upwardly at least through the driving and camming surfaces, a driving pin means adapted to be received in the bore and in driving contact with the driving and camming surfaces thereof, the drive pin including a portion extending axially above the head and forming means for driving the assembly, means extending radially outwardly from the shank to prevent the body from expanding until the work penetrating means has penetrated the work, said expansion prevention means being located in generally the same axial location along the shank as the driving and camming surfaces at the extremity of the bore thereby permitting the drive pin means to be driven through the driving and camming surfaces to set the rivet assembly.

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**3,919,917**

## FASTENER FOR MOUNTING IN THROUGH HOLE PARTICULARLY IN WALL OR CEILING PANEL OR THE LIKE

**Oswald Willy Thorsman, deceased, late of Nykoping, Sweden; by Mary Thorsman, administratrix, Mariebergs Gard, Nykoping, and by Bengt Ahlstrand, administratrix, Kristinelundsvagen 42, Solna, both of Sweden**

**Filed Oct. 3, 1973, Ser. No. 403,297**
**Int. Cl.[2] F16B** *33/10*
**U.S. Cl. 85—74** **6 Claims**

**1.** A fastener for mounting into a hole in a wall, ceiling, or the like for compression between the exterior and interior wall surfaces comprising:

a tubular portion for insertion into and projection through a mating aperture in the wall element,

said tubular portion including at least two expansible bodies which are coaxially arranged and slidable along a screw means and each of which is laterally expandable in response to axial compression, said two bodies being at least initially axially spaced along said screw means and being movable relative to each other at least axially in response to rotation of said screw means,

each of said bodies having divergently movable bendable and circumferentially spaced portions whose free ends face the interior wall surface when said tubular portion is inserted into said aperture,

means responsive to rotation of said screw means to move said end portions divergently outwardly into positions

where their respective end portions abut the interior surface of the wall, said two expansible bodies being rotationally offset relative to each other and with the free end portions of one said body being received between the free end portions of the other said body upon rotation of said screw means to ensure thereby that their respective divergent portions exert forces against the interior wall surface which are circumferentially distributed around said aperture.

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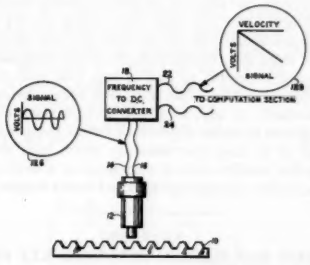
**3,919,918**

## ELECTRONIC FIRING DEVICE FOR SOFT RECOIL WEAPONS

**Ronald H. Rudman, Chatsworth, Calif., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.**

**Filed July 26, 1974, Ser. No. 492,122**
**Int. Cl.[2] F41F** *19/10*
**U.S. Cl. 89—42 B** **11 Claims**




**1.** In a weapon system having recoilable parts adapted for mounting a round of ammunition to be fired, nonrecoilable parts supporting the recoilable parts, and means for accelerating the recoilable parts relative to the nonrecoilable parts during a portion of a firing cycle, the combination comprising a toothed member mounted on one of said recoilable and nonrecoilable parts,

sensing means mounted on the other of said parts and sensitive to the toothed surface of said member during acceler-

ation of the recoilable parts for generating a first electrical signal,

a delay circuit connected to a source of input voltage for generating a second electrical signal which is a function of temperature,

a plurality of networks each connectible for forming a voltage divider and each voltage divider having a terminal whose voltage constitutes a third electrical signal representative of an individual round of ammunition,

first control means responsive to said input voltage and said first, second, and third electrical signals for generating a fourth electrical signal to fire the weapon, and

second control means responsive to said first and third electricals signals for generating a fifth electrical signal to terminate acceleration of said recoilable parts.

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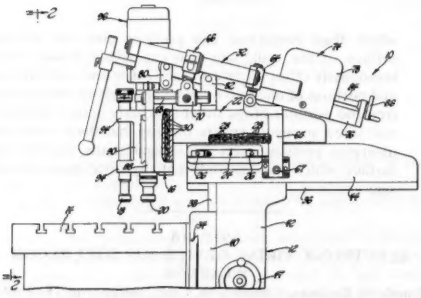
## 3,919,919
## THREE DIMENSIONAL CUTTING MACHINE WITH PANTOGRAPH CONTROL

**Joseph J. Dancsik, 15800 Providence Drive, Southfield, Mich. 48075**

**Continuation of Ser. No. 333,905, Feb. 20, 1973, abandoned. This application Sept. 24, 1974, Ser. No. 508,841**

**Int. Cl.² B23C 1/16**

**U.S. Cl. 90—13.1** **27 Claims**



1. A machine for three-dimensional machining of a workpiece by pantograph control to conform the workpiece to a model, comprising: support means; a fore and aft slide assembly; a lateral slide assembly; a tool and tracer holder assembly; first and second slide means slidably interconnecting said support means, said fore and aft slide assembly and said lateral slide assembly; said first and second slide means being disposed perpendicularly to one another and one directly above the other; third slide means slidably connecting said tool and tracer holder assembly to one of said fore and aft and said lateral slide assemblies; said third slide means being disposed perpendicularly to said first and second slide means; said support means includes adjustment means comprising at least a portion of at least one slideway which may be used for adjusting the position of said assemblies as a unit; and pantograph means for moving said tool and tracer holder assembly.

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## 3,919,920
## MACHINE FOR MAKING OBTUNDED KEY PROFILE

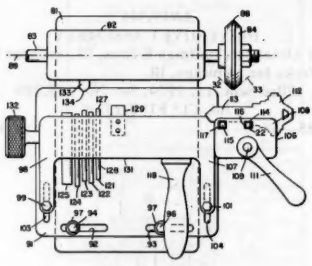
**Ernest L. Schlage, Burlingame, Calif., assignor to Schlage Lock Company, San Francisco, Calif.**

**Division of Ser. No. 252,344, May 10, 1972, abandoned. This application Oct. 2, 1973, Ser. No. 402,738**

**Int. Cl.² B23C 1/16**

**U.S. Cl. 90—13.05** **2 Claims**

1. A machine for cutting an obtunded key from a key blank, comprising a base, means supporting a key cutter for rotation on said base about an axis, a stylus fixed on said base in a plane parallel to said axis and having a longitudinal face and inclined side faces tranverse to said plane, a carriage, means mounting said carriage on said base for universal movement in a plane to said axis, a key blank holder on said carriage adjacent said key cutter, a plurality of elongated depth gauge rods having end surfaces and arranged in parallel, side by side relation with said rods extending toward said axis and adjacent said stylus said stylus and said rods being coplanar, and means mounting said depth gauge rods for individual adjustment on



said carriage toward and away from said axis whereby movement of said carriage toward and along said axis causes said end surfaces of the gauge rods to engage and move along said longitudinal and inclined side faces of said stylus and simultaneously causes said key cutter to cut an obtunded key from a key blank held in said key blank holder.

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## 3,919,921
## HAND FIREARMS AND AMMUNITION THEREFOR

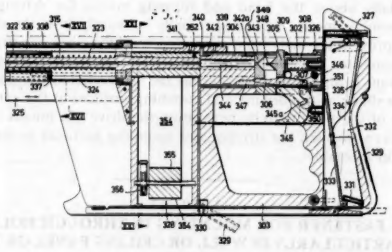
**Hans-Ludwig Schirneker, am Berg 396, A 6833 Klaus, Austria**

**Division of Ser. No. 138,978, April 30, 1971, Pat. No. 3,817,148. This application Apr. 10, 1974, Ser. No. 459,625**

**Claims priority, application Germany, May 2, 1970, 2021597; Jan. 7, 1971, 2100434**

**Int. Cl.² F41D 11/02, 11/10**

**U.S. Cl. 89—132** **2 Claims**



1. A small calibre rifle with an optical sighting mechanism for direct and indirect sighting, said rifle including a stock, a shoulder support, means for pivoting said shoulder support in at least a downward direction, a repeating roller which accommodates a plurality of cartridges having a uniform cross-section over their entire length and which are inserted in said roller in one and the same direction and ejected therefrom after firing, a repeating piston which is displaceable by the gases given off during firing and on which there is arranged a plunger which pushes the cartridges individually from a magazine into said cartridge roller and which in doing so ejects a spent cartridge present in the cartridge roller from the opposite end thereof, said rifle further including a trigger cooperable with an adjustable stop which limits the displaceability of said trigger as required so that it can be optionally locked to individual, sporadic or continuous fire.

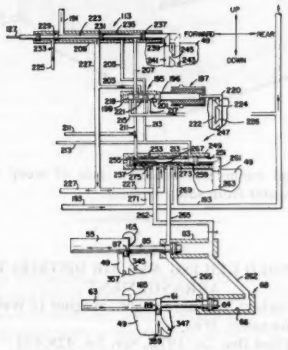
## 3,919,922
## MODULAR LIQUID PROPELLANT GUN

**Thomas M. Broxholm, Palo Alto, and Lester C. Elmore, Portola Valley, both of Calif., assignors to Pulsepower Systems, Inc., San Carlos, Calif.**

**Division of Ser. No. 104,610, Jan. 7, 1971, Pat. No. 3,800,657. This application Jan. 14, 1974, Ser. No. 433,375**

**Int. Cl.² F15B** *21/02*

**U.S. Cl. 91—37** **5 Claims**



**1.** A method of maintaining precise phase relationship between a control valve and a motor in a fluid-powered motor system, said control valve having a first cam follower and said motor having a second cam follower, and said method comprising, rotating a continuous cam, engaging the first cam follower of the control valve within two spaced-apart sides of a first cam trace of the cam to move the control valve back and forth as the cam rotates and to produce corresponding back and forth movement of the motor by directing pressurized fluid to opposite sides of the motor on each reciprocation of the control valve, and engaging the second cam follower of the motor within two spaced-apart sides of a second cam trace on the cam to interlock the movements of the control valve and motor through the cam and to insure that the control valve and the motor move in precise phase relationship with one another.

## 3,919,923
## FLUID FLOW CONTROL VALVE

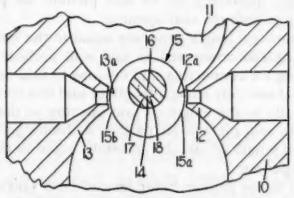
**Richard Woolliscroft Haigh, Worcester, England, assignor to Lucas Aerospace Limited, Birmingham, England**

**Continuation of Ser. No. 342,706, March 19, 1973, abandoned. This application Oct. 3, 1974, Ser. No. 511,797**

**Claims priority, application United Kingdom, Mar. 18, 1972, 12799/72**

**Int. Cl.² F15B** *13/044*

**U.S. Cl. 91—51** **6 Claims**



**1.** A fluid flow control valve comprising a nozzle having an end surface on to which a fluid flow passage opens, said end surface being a part-cylindrical form with its axis transverse to the axis of the fluid flow passage, and a flow control member having a part-cylindrical surface portion of substantially the same radius as said end surface, said flow control member being mounted for movement about a pivotal axis lying within a cylindrical zone which is, in part, defined by said surface portion, said pivotal axis being in spaced, parallel relationship with the axis of said end surface and positioned so that the part-cylindrical portion of the flow control member can make substantially face to face contact with the end surface of the nozzle.

## 3,919,924
## MATRIX ASSEMBLY FOR CREASING CARDBOARD AND LIKE MATERIALS

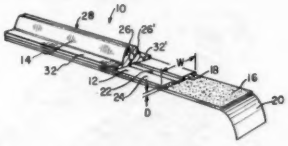
**Frank M. Snodgrass, St. Anne's-on-Sea, England, assignor to IPC, Incorporated, Martinsburg, W. Va.**

**Filed Feb. 1, 1974, Ser. No. 438,673**

**Claims priority, application United Kingdom, July 19, 1973, 34374/73**

**Int. Cl.² B26D** *3/08*

**U.S. Cl. 93—59 R** **6 Claims**



**1.** A matrix assembly for facilitating the creasing of card material by a creasing rule and opposed cutting plate comprising:

a unitary matrix strip defined by an elongate flexible plastic element having a channel formed along its longitudinal axis;

a locater strip thermally bonded to and removable from said matrix strip and defined by an elongate flexible plastic element having a slit formed along its longitudinal axis, said locater strip being positioned over and relative to said matrix strip with said slit aligned with said channel; and

an adhesive layer secured to a surface of said matrix strip for fastening said assembly to a cutting plate.

## 3,919,925
## PROCESS AND EQUIPMENT FOR CONTINUOUS MANUFACTURE OF CORRUGATED CARDBOARD BOX

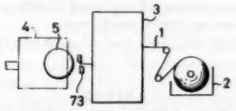
**Akio Hayama, c/o Raitsu Rika Kenkyu-Sho, No.1/7, Miyakojima-Hondori-5-Chome, Miyakojima-ku, Osaka, Japan**

**Filed Apr. 3, 1974, Ser. No. 457,559**

**Claims priority, application Japan, Apr. 10, 1973, 48-41163; May 5, 1973, 48-49912**

**Int. Cl.² B31C** *11/02*

**U.S. Cl. 93—94 PS** **33 Claims**



**1.** A process for continuously manufacturing flattened corrugated cardboard boxes from a single liner strip, said process comprising:

passing a single liner strip of a selected width through a corrugating machine, and intermittently forming corrugations in said liner strip, transverse to the longitudinal direction thereof, at regular intervals therealong, thus forming a material strip having regularly alternating corrugated portions and non-corrugated portions;

winding a selected length of said material strip circumferentially about a mandrel with at least one said corrugated portion overlapping at least one said non-corrugated portion, and joining said thus overlapped portions, thus forming a blank having a length equal to said width;

thereafter performing known line ruling and slotting processing operations on said blank; and

flattening the thus processed tubular blank to form a flattened corrugated cardboard box.

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**3,919,926**

**FLOOR STRUCTURE OF CAR BODY**

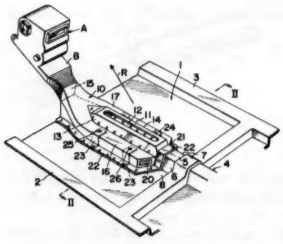
**Kohsaku Yamada, Toyota, Japan, assignor to Toyota Jidosha Kogyo Kabushiki Kaisha, Japan**

**Filed Apr. 29, 1974, Ser. No. 465,076**

**Claims priority, application Japan, May 16, 1973, 48-57457**

**Int. Cl.[2] A47C** *7/74*; **B60H** *1/00*

**U.S. Cl. 98—2.03** **7 Claims**



1. In an automobile having individually mounted seats and a drive shaft for transmitting power to wheels thereof, a floor construction for an automobile body, said floor construction comprising:

a floor plate comprising, substantially along the centerline thereof, a substantially longitudinally extending substantially inverted U-shape tunnel portion adapted to partially surround the drive shaft, and a plate portion extending transversely from each lower edge of each side of the tunnel portion in a direction from the other side thereof, a substantially longitudinally extending reinforcing member mounted over the tunnel portion, said reinforcing member being connected to each plate portion and comprising attaching portions on each side threof adapted to have an inner seat track of a respective seat connected thereto,

said reinforcing member, a longitudinally extending portion of each side of the tunnel portion, and a longitudinally extending portion of the respective plate portion extending from that side defining a respective substantially longitudinally extending air duct therebetween,

an opening at one end of said ducts fluidly connected to the outlet of an air conditioner, and

an air outlet at the other end of each of said ducts.

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**3,919,927**

**TWIN VENTILATOR FIXTURE**

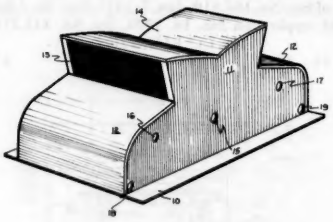
**John E. Bernard, Jr., 1804 Skycoe Drive, Salem, Va. 24153**

**Filed Oct. 18, 1974, Ser. No. 516,106**

**Int. Cl.[2] B60H** *1/28*

**U.S. Cl. 98—2.17** **1 Claim**

1. A twin ventilator fixture having a pair of back to back air inlets spaced a predetermined distance from one another, a pair of air exhausts, one for each inlet, positioned below and offset therefrom, a curved duct from each said inlet to each said exhaust, a trough supporting said ducts and forming therewith a reservoir for collecting moisture, weep holes arranged in a line across the lower extremeties of each said duct for discharging water accumulated by the said ducts into said



reservoir, and means comprising a pair of weep holes for discharging water from said reservoir.

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**3,919,928**

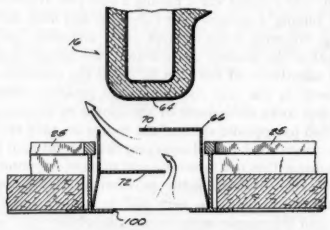
**SUSPENDED CEILING AND AIR DISTRIBUTION ARRANGEMENT**

**Robert R. Lambert, Glendora, Calif., assignor to Wehr Corporation, Milwaukee, Wis.**

**Filed Dec. 26, 1973, Ser. No. 428,424**

**Int. Cl.[2] F24F** *13/02, 7/00*

**U.S. Cl. 98—40 D** **8 Claims**



1. In combination in a suspended ceiling including a plurality of ceiling members, a plurality of ceiling support members and means defining an elongated slot in said ceiling the improvement of an air delivery arrangement comprising, in combination,

means including a generally closed tubular wall portion defining an elongated, linear plenum air passage,

means defining an elongated, linear opening in said wall portion and extending parallel to the longitudinal axis of said plenum air passage,

the length of said opening being less than the overall length of said linear plenum air passage,

means for delivering air to said plenum air passage for discharge through said opening,

means having a length generally equal to the length of said opening and connected to said wall portion along said opening for connecting said opening to said means defining said slot only along a length of said slot corresponding generally to the length of said opening so that air delivered to said plenum air passage is discharged through a limited length of said slot generally equal to the length of said opening,

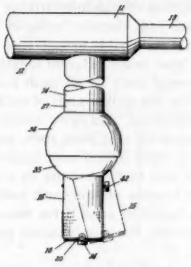
and said linear plenum being spaced from said ceiling support members so that air is delivered through said slot from said opening while the length of said slot adjacent that through which air is delivered is in alignment with a closed extension of said tubular wall portion and provides an air return.

3,919,929

## MULTIPLE-CONTROL AIR DISTRIBUTION OUTLET DEVICE

William M. Harmon, Westerville, Ohio, assignor to United Sheet Metal Company, Westerville, Ohio

Filed Nov. 21, 1973, Ser. No. 418,045
Int. Cl.[2] F24F 13/08
U.S. Cl. 98—41 11 Claims



1. An air distribution outlet device comprising:

an elongated barrel having opposed air inlet and outlet ends and an intermediate, longitudinally extending wall portion formed with a multiplicity of orifices around the entire periphery for a predetermined axial length permitting transverse outflow of air from said barrel, and means for connecting said inlet end to a source of air under pressure.

a flow control valve mounted on said barrel at the outlet end thereof in downstream relationship to said wall portion formed with orifices, said valve adjustable to selected predetermined positions between fully closed and open positions for controlling axial outflow from the outlet end of said barrel, said valve when adjusted to a position at least partially restricting airflow through said outlet end causing outflow through the orifices in said barrel in proportion to the degree of axial flow restriction of said valve to thereby effecting control over a distributive air flow pattern in axially outward displaced relationship to said outlet end.

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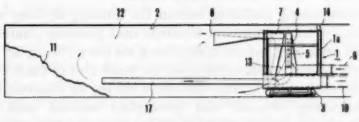
3,919,930

## AIR CIRCULATING APPARATUS FOR USE IN TUNNELS

Masahiro Yoshikawa; Yoshio Matsuoka, and Kiyotaka Takamatsu, all of Yokohama, Japan, assignors to Mitsui Shipbuilding Company, Tokyo, Japan

Filed Nov. 14, 1973, Ser. No. 415,647
Claims priority, application Japan, Nov. 22, 1972, 47-117288
Int. Cl.[2] E21F 1/00
U.S. Cl. 98—50 7 Claims



1. Air circulating apparatus for use in a tunnel comprising a movable carriage, air supply duct means mounted on said carriage, said carriage being provided with a framework having upper and side wall members designed to fit within a tunnel and defining a passageway therebetween and said air supply duct means having a corresponding configuration, means for supplying fresh air to the air supply duct means, said air supply duct means including air discharge port means for forming a fresh air curtain across the passageway defined by the framework and air supply duct means, exhaust duct means mounted on safe carriage and projecting forwardly beyond the fresh air curtain for exhausting gases and stale air from space closed by the fresh air curtain, and means mounted on said framework for forming a substantially airtight seal between the framework and the sides and roof of a tunnel or other enclosed space in which the apparatus is used.

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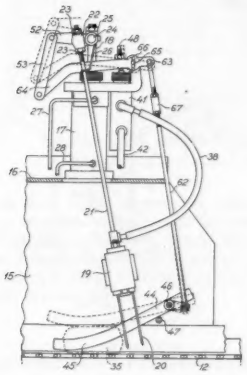
3,919,931

## APPARATUS FOR INJECTING FLUID INTO PIERCEABLE, FLUID-PERMEABLE BODIES

Knud Liljenberg, Kolding, Denmark, assignor to Slagteriernes Faellesindkobsforening A.m.b.A., Hvidovre, Denmark

Filed Dec. 11, 1973, Ser. No. 423,656
Int. Cl.[2] A23B 4/02
U.S. Cl. 99—533 16 Claims



7. An apparatus for introducing brine or a similar fluid into meat bodies, said apparatus comprising

a. a conveyor for moving said meat bodies along a predetermined path,

b. a plurality of substantially parallel hollow needles extending transverse to said conveyor, each needle having brine discharge openings which are all positioned adjacent to the pointed end of the needle,

c. means for supplying brine under pressure into said hollow needles,

d. means for reciprocating said needles between a first position in which they penetrate into meat bodies aligned transversely with respect to said predetermined path, and a second position in which said needles are out of engagement with said bodies, said reciprocating means being adapted to commence movement of the needles from the said first position substantially immediately after reaching that position,

e. stripping means arranged above said conveyor so as to allow said bodies to pass between said conveyor and said stripping means which substantially prevent said bodies from being moved out of engagement with said conveyor by said needles when they move from their first to their second position, said stripping means comprising a number of stripping members arranged in side-by-side relationship and each extending in the longitudinal direction of the conveyor, said stripping members being separately and independently movable up and down in relation to said conveyor when engaged by the meat bodies passing beneath them, and

f. means for controlling said brine supply means so as to start supply of brine to said needles in a third position thereof between said second and first positions and approximately at the point of penetration by said needles, and to interrupt supply of brine in a fourth needle posi-

tion between said first and second positions and approximately at the point of disengagement by said needles,

g. means for adjusting said third and fourth positions along the stroke of the reciprocating movement of the needles and sensing means engaging said stripping members and controlled by the immediate position of the uppermost of said stripping members to operate said means for adjusting said third and fourth positions.

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**3,919,932**

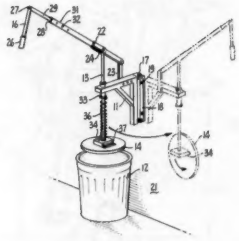
**NO STEP GARBAGE CAN PRESS**

**Antonio F. Basuino, 650 Higate Drive, Daly City, Calif. 94015**

**Filed Jan. 4, 1974, Ser. No. 430,949**

**Int. Cl.[2] B30B *1/04***

**U.S. Cl. 100—228** **10 Claims**



1. A manually operated garbage compactor for use with open top garbage receptacles comprising

a frame having a wall plate and adapted for mounting on a wall in operative position above a garbage receptacle,

a plunger carried for vertical movement by said frame,

a pressure member carried by said plunger for vertical reciprocation into and out of the garbage receptacle,

manually operable means for vertically displacing said plunger downwardly for forcing said pressure member down to compact garbage in the receptacle, and pivot means in said frame formed for swinging movement of said frame between a first position in which said plunger is vertically aligned with the can and a second position in which said frame is folded back against the wall to leave the area over the can unobstructed.

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**3,919,933**

**HIGH SPEED PRINTER**

**John T. Potter, Locust Valley, N.Y., assignor to Potter Instrument Company, Inc., Plainview, N.Y.**

**Filed Oct. 5, 1973, Ser. No. 403,909**

**Int. Cl.[2] B41J *9/42***

**U.S. Cl. 101—93.32** **6 Claims**

1. A high-speed, on-the-fly chain printer comprising:

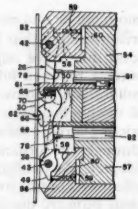
means supporting a linear font of printing characters for continuous movement in a linear path parallel to a line to be printed on a flexible print receiving medium;

a linear bank of individually actuatable hammers, each hammer being operable to strike the print receiving medium against any one of said printing characters as same passes such hammer on-the-fly, there being at least fourteen of said printing characters and at least fourteen of said hammers for each linear inch of said font and said bank, respectively;

including independent actuating means for operating each of said hammers;

wherein said actuating means comprises a plurality of low inertia push rods each having a hammer end for engaging each of said hammers and an opposite striker end, means supporting said push rods intermediate said ends in at least one common plane for independent free axial movement in the direction of hammer striking movement, the axes of said push rods thereby being in parallel spaced interrelation, said push rods in said one common plane also being of at least three different lengths and arranged so that the hammer ends of all push rods are laterally aligned and so that the striker ends of each third push rod are in lateral alignment, and drive means to engage the striker end of each of said push rods, said drive means being arranged in three lateral rows spaced at increments from the line of said hammer bank by a distance corresponding to the lengths of said push rods, the center to center distance between each drive means in each row being three times the spacing between push rods in said common plane;

wherein said linear bank of hammers comprises interlaced upper and lower hammer tiers, the hammers in said upper tier having heads depending from a common upper pivotal axis and the hammers in said lower tier having heads



upstanding from a common lower pivotal axis, the heads of said upper and lower hammer tiers being successively alternated in said linear bank so that the center to center spacing between the hammers in each tier is twice that of like spacing in said bank, said push rods also being arranged in upper and lower planar tiers to engage the respective hammers in said hammer tiers intermediate said heads and said common pivot axes, whereby the spacing of said push rods in each of said planar tiers is also twice the center to center spacing between said hammer heads in said linear bank;

and comprising snubbing means for limiting striking movement of said hammers towards said printing characters, said snubbing means comprising means defining an abutment surface spaced beyond the head end of each of said hammers, each of said hammers having an abutment tang projecting beyond and presented behind said head thereby to engage said abutment surface upon actuation of said hammers;

wherein said snubbing means comprises upper and lower bars each being formed having slots to receive portions of said hammers between the heads thereof and said pivotal axes respectively, said abutment surface for engagement by said tangs on said upper tier hammers being located between said slots on said lower bar and said abutment surface for engagement by said tangs on said lower tier hammers being located between said slots on said upper bar.

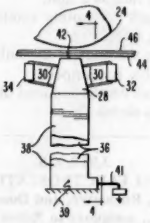
## 3,919,934
## POWER MINIMIZATION FOR ELECTROSTRICTIVE ACTUATED PRINTERS

**Jack Beery, Farmington, Mich., assignor to Burroughs Corporation, Detroit, Mich.**

**Continuation-in-part of Ser. No. 359,792, May 14, 1973, abandoned, which is a continuation-in-part of Ser. No. 110,802, Jan. 29, 1971, abandoned. This application July 22, 1974, Ser. No. 490,780**

**Int. Cl.² B41J** *9/38*

**U.S. Cl. 101—93.29** **10 Claims**




1. An electrostrictive actuator system for use in a printer including:

an electrostrictive member;

power supply means for applying a potential difference across the opposed surfaces of said electrostrictive member wherein said potential difference is effective to contract said electrostrictive member;

a plurality of switching means connected in series to said power supply means, for discharging said potential difference across said electrostrictive member;

divider means connected to said power supply means and said switching means, for reducing the potential across each of said plurality of switching means;

timing means connected to said switching means for causing each of said switching means to selectively open thereby being effective to discharge said potential across said electrostrictive member and thereby causing said electrostrictive member to expand; and

print means responsive to the expansion of said electrostrictive member for performing print operations.

## 3,919,935
## CONTROL APPARATUS FOR THE RECORDING HEAD OF A PARALLEL PRINTER

**Wolfgang Langnickel, Braunschweig, Germany, assignor to Olympia Werke AG, Wilhelmshaven, Germany**

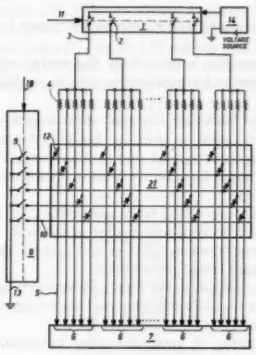
**Filed Mar. 22, 1974, Ser. No. 453,879**

**Claims priority, application Germany, Mar. 27, 1973, 2315152**

**Int. Cl.² B41J** *7/08*

**U.S. Cl. 101—93.04** **9 Claims**

1. In a control circuit for a multiple printing position printer having a stationary printing head which extends over the entire width of a printing line and has a plurality of individual printing elements for each printing position, said circuit including a printing position selection means for selectively applying printing current to the printing elements of a selected printing position, and a character selection means, which is common to all printing positions, for controlling the flow of printing current to the printing elements of the selected printing position in dependance on the particular character to be printed at said selected printing position, the improvement wherein: said position selection means has a plurality of outputs each of which is connected via respective series resistors with all of said individual printing elements of the associated printing position; and character selection means has a plurality of output leads each associated with only one printing element of each of a plurality of said printing positions, and a plurality of controllable normally open short circuit switches each of which is connected in series between one of said character outputs and a point of reference potential; and, each of said printing elements is connected to the associated one of said character output leads only via a separate decoupling diode whereby the selective closing of one or more of said switches will short circuit the printing current flowing from said position selection means around the printing element of the selected printing position associated with the closed switch and only the printing elements of the selected printing position which are associated with open ones of said switches will be supplied with printing current.



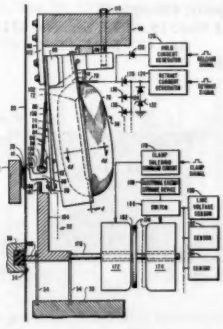
## 3,919,936
## HIGH SPEED LINE PRINTING APPARATUS

**Gordon Brent Barrus, El Segundo; Leo Joseph Emenaker, Playa Del Rey, and Raymond Franklin Melissa, Inglewood, all of Calif., assignors to Pertec Corporation, El Segundo, Calif.**

**Division of Ser. No. 333,221, Feb. 16, 1973, Pat. No. 3,834,303. This application Jan. 23, 1974, Ser. No. 435,883**

**Int. Cl.² B41J** *9/38*

**U.S. Cl. 101—93.14** **3 Claims**



1. In a high speed line printing apparatus for printing on a print-receiving medium such as a paper form, said apparatus including a print mechanism comprising hammer means selectively operable during print cycles in timed relation with a

movable character carrier to make printing impact with said paper form and means for advancing said paper form in a feed direction incrementally past said print mechanism, said hammer means having a printing impact position and a retracted position away from said printing impact position, said paper form being advanced between successive timed print cycles, the character carrier being of the type which moves transverse to the feed direction of the paper form, the combination comprising:

means for tensioning and clamping the paper form including:

i. a bar extending substantially the entire width of said paper form and positioned to ride in contact with said form;

ii. a resilient backstop disposed opposite said bar;

iii. means coupled to said bar for continuously biasing said paper form against said resilient backstop to maintain said paper form under tension during advancement thereof; and

iv. means responsive to said timed print cycles for displacing said bar toward said backstop to firmly clamp said paper form between said bar and said backstop during each of said timed print cycles;

said print mechanism being disposed between said advancing means and said tensioning and clamping means along the feed direction of said paper form;

means for sensing at least one error condition requiring inhibition of said hammer means to prevent said hammer means from reaching said printing impact position, said sensing means producing a signal indicative of the presence of said error condition;

an interposer member integral with said bar, said interposer member having an inhibiting position in which said member is disposed to engage said hammer means and prevent said hammer means from reaching said printing impact position and a non-inhibiting position in which said hammer means is free to move to said printing impact position, said member being biased to said non-inhibiting position by said biasing means, the mass of said interposer and bar being substantially greater than the movable mass of said hammer means; and

means coupled to said error sensing means and connected to said interposer member and bar for displacing said member to said inhibiting position in response to said error-indicating signal.

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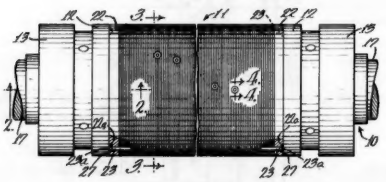
**3,919,937**

## MAGNETIC CYLINDER FOR PRINTING PRESSES

**Louis Kostal, Downers Grove, Ill., assignor to R. R. Donnelley & Sons Company, Chicago, Ill.**

**Filed Mar. 15, 1974, Ser. No. 451,364**
**Int. Cl.[2] B41F *13/10***
**U.S. Cl. 101—378** **17 Claims**



1. A magnetic printing cylinder comprising, in combination: a shaft having a hub of uniform diameter and end portions of reduced diameter;

a magnetic assembly that makes a sliding fit on said hub, said magnetic assembly comprising alternate thin carrier ring means of non-magnetic material and thin annular pole pieces of magnetic material, said carrier ring means and said pole pieces having planar faces which abut over their entire facing areas, and each of said carrier ring means having a plurality of magnet mounting holes about its circumference,

a magnet in each of said holes, said magnets having their poles abutting the faces of the pole pieces and there being like poles abutting both faces of each pole piece so alternate pole pieces are of opposite polarity,

non-magnetic annular end plates at the ends of the assembly,

and a plurality of tie rods impaling both end plates, the carrier ring means and the pole pieces to form them into a unitary assembly which may be mounted on and removed from the hub as a unit;

interengaging means preventing rotation of the magnetic assembly on the hub;

threaded means at the ends of the hub between which the magnetic assembly is clamped;

and bearers retained on the reduced diameter end portions of the shaft by a shrink fit.

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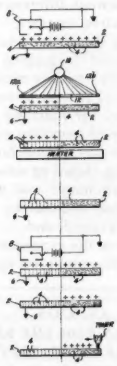
**3,919,938**

## PERMANENT ELECTROSTATIC MASTER

**Eugene P. Goldberg, Rochester, and Donald A. Seanor, Pittsford, both of N.Y., assignors to Xerox Corporation, Stamford, Conn.**

**Filed Sept. 20, 1974, Ser. No. 507,710**
**Int. Cl.[2] B41M *1/42***
**U.S. Cl. 101—401.1** **12 Claims**



1. A method of storing images in a matrix having electrically anisotropic particles dispersed therein and reproducing said images comprising the steps of:

charging said matrix to establish image-charge regions on the surface thereof and a corresponding electric field in the interior of said matrix,

softening said matrix in the presence of said surface image-charge regions thereby reducing the viscosity of the matrix and aligning the anisotropic particles in accordance with said surface image-charge regions,

cooling said matrix to fix the position of said aligned anisotropic particles whereby the matrix contains electrical image regions corresponding to said surface image-charge regions,

subsequently producing a visual image by the steps of:

charging said matrix,

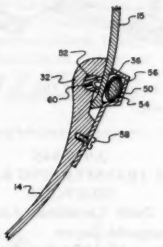
allowing image-charge regions to form on the surface of said matrix by selective discharge through said electrical image regions in said matrix, and

developing said image-charge regions of said master.

## 3,919,939
## METHOD AND MEANS FOR FLASH SUPPRESSION

**James L. Murray, and Lawrence M. Sires, both of China Lake, Calif., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.**

**Filed Nov. 1, 1974, Ser. No. 519,960**
**Int. Cl.[2] F42B** *25/16*
**U.S. Cl. 102—7.2** **6 Claims**




1. In an aerial delivery cargo dispenser comprising a hollow aluminum shell and a shaped charge device within said shell positioned to cut open said shell, the improvement comprising:

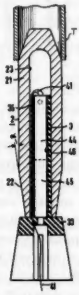
a tubular plastic container fastened externally of said shell in line with and substantially coextensive with the shaped charge device; and

a visible light flash suppressant in said container consisting essentially of a salt selected from the group consisting of sodium chloride, sodium bicarbonate, aluminum oxide, calcium fluoride and potossium chloride.

## 3,919,940
## EXPLOSIVE-ACTIVATED PLUG

**Manfred Ploger, and Lothar Stieding, both of Erlangen, Germany, assignors to Siemens Aktiengesellschaft, Munich, Germany**

**Filed Aug. 15, 1973, Ser. No. 388,754**
**Claims priority, application Germany, Aug. 25, 1972, 2241753**
**Int. Cl. F42b** *3/04*; **F16l** *55/18*
**U.S. Cl. 102—24 R** **4 Claims**

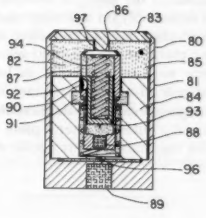



1. An explosive-activated plug for sealing the end of a tube comprising part of a heat exchanger including tube parts made of nickel-chromium, heat-resistant alloy, said plug being made of a corresponding alloy as the nickel chromium alloy and shaped for a snug, slideable insertion in the tube end and having a longitudinally extending blind bore in which is removably positioned a cartridge including a detonator and an explosive, the cartridge including an explosive force-transmitting casing made of non-metallic material; wherein the improvement comprises an aluminum thin walled tubing mechanically integrating both said detonator and explosive, and said detonator and explosive having compositions which after combustion leave only lead-free deposits.

## 3,919,941
## LIQUID TIMING DEVICE

**David S. Breed, 270 Hillcrest Road, Boonton Township, N.J. 07005; Torbjorn Thuen, 12 Ahern Way, Roseland, N.J. 07068, and Allen K. Breed, 153 Farber Hill Road, Boonton Township, N.J. 07005**

**Filed Sept. 25, 1973, Ser. No. 400,557**
**Int. Cl.[2] F42C** *15/24*
**U.S. Cl. 102—78** **13 Claims**

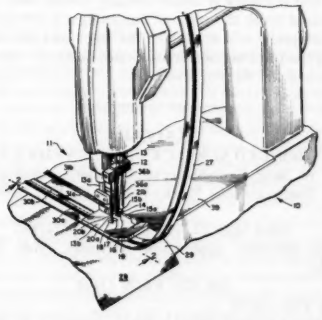



1. A fuzing device comprising a liquid tight sealed housing containing a liquid having a kinematic viscosity less than 10 centistokes; a primer in the liquid adapted to move from a first position relative to an output lead to a second position relative to the output lead; means for causing the movement of the primer to the second position after sensing a predetermined external stimulus, said means including the liquid and a movable sensing mass in the liquid, the liquid acting to offer resistance to movement of the mass; a firing pin in the liquid and a release means in the liquid cooperating with said firing pin to release said firing pin following a predetermined motion of said sensing mass against resistance offered by the liquid upon sensing a predetermined external stimulus.

## 3,919,942
## PARALLEL LOOPER-STITCHING DEVICE

**William Galya, Rte. No. 2, merriden Drive, Brewster, N.Y. 10509, and Jack E. Shuffield, 29 Carpenter Ave., Norwood, N.J. 07648**

**Filed May 31, 1974, Ser. No. 475,037**
**Int. Cl.[2] D05B** *1/10*
**U.S. Cl. 112—166** **2 Claims**



1. A dual paired-needle loop-stitching device comprising in combination: needle means including a needle arm structure adapted to be mounted on an upwardly and downwardly

reciprocatable needle-action lever, the needle structure providing dual mounting positions for adjacent pairs of needles with the pairs being in substantially parallel planes with one pair off-set rearwardly of and lateral to the other in side-by-side relationship; relative to a direction from a first lateral position to an opposite lateral position, consecutive first and second pairs of needles, each pair of needles having a first elongated needle of each pair and a second short needle and a dual loop-stitch swing-arm means including an upright pivoted arm adapted for to and fro lateral swing-action in an upright plane, and two off-set staggered loop-forming lateral-extending projections mounted for reciprocatable to and fro motion in said upright plane transversely beneath the dual mounting positions with the first projection in travel-path alignment with and beneath one of the pairs of needles and with the second projection in travel-path alignment with and beneath the second of the pairs of needles; and a foot-plate means mounted detachably on a sewing machine foot-support structure, the foot-plate means including a horizontally forwardly-extending plate having first and second through-apertures aligned one next to the other in lateral relationship beneath the first pair of needles and including off-set therefrom a third through-aperture for the first elongated needle of the second pair and a cutaway lateral-plate portion providing through-space for the second short needle of the second pair of needles.

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**3,919,943**

## TRACK SURFACING METHOD

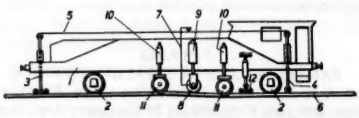
**Erma Plasser; Josef Theurer, both of Johannesgasse 3, Vienna, Austria (A-1010); Egon Schubert, Lainzerstr. 246/8, Vienna, Austria, and Klaus Riessberger, Paniglgasse 24, Vienna, Austria**

**Division of Ser. No. 404,427, Oct. 9, 1973. This application July 22, 1974, Ser. No. 490,394**

**Claims priority, application Austria, Oct. 13, 1972, 8816/72**

**Int. Cl.[2] E01B** *37/00*

**U.S. Cl. 104—7 R** **25 Claims**



**1.** In a method of surfacing a track consisting of rails fastened to ties resting on ballast, wherein the ballast is compacted and the track is simultaneously downwardly displaced to a desired level: the steps of imparting a substantially horizontal vibration to a section of the track and simultaneously pressing the track section substantially vertically down until it has reached the desired level.

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**3,919,944**

## WINGED SURFACE EFFECT VEHICLE

**Gunter W. Jorg, Grossbieberau, Germany, assignor to Vereinigte Flugtechnische Werke-Fokker GmbH, Bremen, Germany**

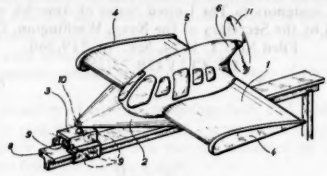
**Filed May 22, 1974, Ser. No. 472,187**

**Claims priority, application Germany, May 26, 1973, 2327024**

**Int. Cl.[2] B61B** *13/08*

**U.S. Cl. 104—23 R** **6 Claims**

**1.** Winged surface effect vehicle improved by means of a guide element for engagement with and connection to a rail track for holding the vehicle laterally in relation to the track while the vehicle is supported by and rides on an air cushion developed on forward thrust between the wings and ground without being supported on the rail, the vehicle being stabi-



lized vertically in its air cushion ride by being held in relation to the guide element.

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**3,919,945**

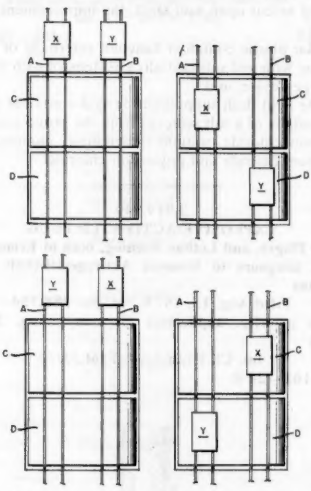
## DEVICE FOR TRANSFERRING RAILWAY CARS SIDEWAYS

**Hisazuchi Kojyo, 2040 Umazima, Aza, Otsushima, Oaza, Tokuyama, Yamaguchi, Japan**

**Filed Aug. 12, 1974, Ser. No. 496,797**

**Int. Cl.[2] B61J** *1/10, 1/12*

**U.S. Cl. 104—50** **1 Claim**



**1.** A device for simultaneously exchanging individual uncoupled railway cars in a direction transverse to the direction of a railway track comprising in combination with a first and second stationary railway track set means wherein said first and second track set means are parallel to each other;

at least two pairs of movably-mounted parallel-arranged platform rail track means; endless conveyor means respectively underlying and supporting each said pair of movably-mounted parallel-arranged platform rail track means, each of said conveyor means operatively movable between a first position and a second position, each of said conveyor means when in its first respective position being effective to align one of its parallel pairs of rail track means with the respective stationary track set means to receive an individual uncoupled railway car thereon, each of said conveyor means when operatively moved to its second respective position being effective to locate the first mentioned pair of parallel track means to be in registry with the other respective stationary track set means, each of said conveyor means employing a series of side-by-side arrangement of roller bearings for providing the required support for the movement of an

individual uncoupled railway car on its respective rail track means, each of said conveyor means positioned within an underground recess; and means associated with the respective conveyor means to selectively drive and control the simultaneous exchange of individual uncoupled railway cars transversely from one track to another.

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**3,919,946**

## OVERHEAD RAILWAY STRUCTURE FOR SUSPENDED LOAD CARRYING DEVICES

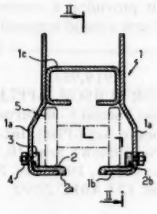
**Claude Laurent, Ecuelle, France, assignor to Aerail Societe D'Etudes et de Representations, Industrielles Mecaniques et Metallurgiques S.E.R.I.M.M., Malakoff, France**

**Filed June 10, 1974, Ser. No. 478,108**

**Claims priority, application France, June 12, 1973, 73.21801**

**Int. Cl.[2] B61B** *3/00, 25/22*

**U.S. Cl. 104—94** **14 Claims**




1. An overhead railway structure for suspended load carrying devices having a rail comprising two supporting sections each having attached thereto an elongate track, wherein the tracks have located along the longitudinally extending edges thereof elongate lips

which extend substantially perpendicular to the longitudinal axes of the tracks and wherein attachment means are provided for attaching said tracks to said sections in a manner to provide a clearance between one edge surface of respective lips and an opposing surface of respective ones of said attachment means.

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**3,919,947**

## TRACK UNIT FOR HIGH-PERFORMANCE RAPID-TRANSIT TRAINS

**Michael Simon, and Werner Geyer, both of Munich, Germany, assignors to Maschinenfabrik Augsburg-Nurnberg AG, Germany**

**Filed Jan. 10, 1974, Ser. No. 432,210**

**Claims priority, application Germany, Jan. 10, 1973, 2301027**

**Int. Cl.[2] B61B** *3/02;* **E01D** *9/00*

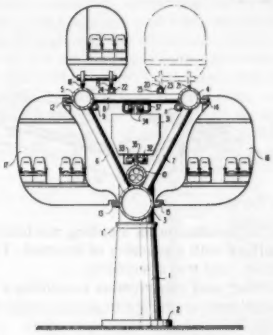
**U.S. Cl. 104—124** **53 Claims**

1. Track unit apparatus for guiding and supporting overhead or suspension type train vehicles, particularly train vehicles of high performance rapid transit trains; said apparatus comprising:

train vehicle guide means extending in the travel direction of said train vehicles, said train vehicle guide means including means for supporting said train vehicles while guiding same along said travel direction,

and supporting frame means for supporting said vehicle guide means in position,

said supporting frame means including frame members connected directly to said train vehicle guide means, said frame members including three longitudinal members extending in the travel direction of said train vehicles, said longitudinal members being connected with one another by latticework extending transversely of said travel direction, said longitudinal members being positioned at respective corners of a triangle with two of said longitudinal members being located at a first level and the other of said longitudinal members being located spaced vertically from and intermediate said two longitudinal members, said train vehicle guide means including at least



one vehicle guide track on each of the longitudinal members.

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**3,919,948**

## DUAL TRANSMISSION LOCOMOTIVE

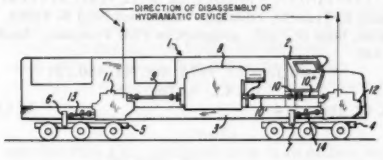
**Siegfried Kademann, Sanderhausen near Kassel, Germany, assignor to Rheinstahl AG, Essen, Germany**

**Continuation-in-part of Ser. No. 70,937, Sept. 9, 1970, abandoned, which is a continuation of Ser. No. 267,114, March 22, 1963, abandoned. This application June 13, 1973, Ser. No. 369,718**

**Claims priority, application Germany, Feb. 18, 1963, 1214717**

**Int. Cl. B61c** *5/00, 9/14, 9/26*

**U.S. Cl. 105—341 R** **5 Claims**

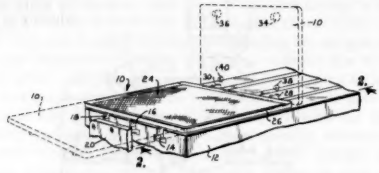



1. A universal joint shaft drive system of a Diesel hydraulic rail drive vehicle especially a locomotive having a body comprising substantially vertically embodied trucks and a main frame means connecting said trucks and having a drive engine mounted thereon, comprising: two hydraulic drive units mounted in the same direction on said main frame means and including two transmission means, a power take-off on each end of the drive engine, a first pair of drive shafts each connecting one of the power take-offs with transmission means carried by the main frame means, a second pair of drive shafts each connecting one transmission means and distributor drive gear means respectively on a truck, whereby power from the drive engine is transmitted to the trucks to drive said locomotive, the second pair of drive shafts being connected to sides of the transmission means which face toward the same end of the locomotive, and means for permitting assembly of said transmission means from above and disassembly thereof upwardly by removal from the trucks when the locomotive body is on the trucks.

## 3,919,949
## MILLING MACHINE TOOL TRAY

Thomas G. Rendleman, 337 S. Stevenson, Olathe, Kans. 66061

Filed Sept. 23, 1974, Ser. No. 508,451
Int. Cl.[2] A23D 7/08
U.S. Cl. 108—27 4 Claims



1. A tray for installation on a milling machine table having an upper surface with a plurality of inverted, T-shaped slots formed therein, said tray comprising:

a tray member, said tray member presenting a substantially horizontal surface adapted to receive loose tools thereon for temporary storage;

at least one support for said tray member located in proximity to one end thereof, said support being of a configuration to slidably fit within one of said slots to support said tray member for free sliding movement relative to said table, said support being of a length to engage the bottom of said slot to support said one end of said tray member a spaced distance above said upper table surface; and

at least one leg member extending downwardly from said tray member at a location offset from said support and in proximity to the end of said tray member opposite from said one end thereof, said leg member being received in one of said slots and engaging the bottom thereof to support said opposite end of said tray member a spaced distance above said upper table surface, said support and leg member thereby cooperating to space said tray member above said table in a substantially horizontal disposition.

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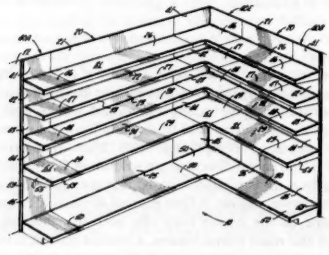
## 3,919,950
## CONTINUOUS MODULAR SHELVING SYSTEM

Ronald B. Frazelle, Fountain Valley, and Neal B. Fuller, Anaheim, both of Calif., assignors to PBR Company, Anaheim, Calif.

Filed June 17, 1974, Ser. No. 480,221
Int. Cl.[2] A47B 57/00
U.S. Cl. 108—114 12 Claims



1. A shelving system comprising:

a shelf unit including

at least one planar surface adapted for mounting to a vertically disposed support surface; and

at least one substantially hollow cantilever shelf made integral with said planar surface and extending generally perpendicular thereto, said shelf having upper and lower surfaces joined by an integral outer edge and being open at the opposite ends thereof; and

a connecting unit including

at least one planar surface adapted for mounting to said vertically disposed support surface, coplanar with said shelf unit planar surface; and

at least one cantilever shelf made integral with said planar surface and extending generally perpendicular thereto, said shelf having upper and lower surfaces joined by an integral outer edge adapted for mounting coplanar with said shelf unit upper and lower surfaces and outer edge, respectively, and a pair of end walls made integral with said upper and lower surfaces and said outer edge to enclose the opposite ends of said shelf,

said upper and lower surfaces and said outer edge at one end of said shelf being offset inwardly by an amount approximately equal to the thickness of said surfaces, said offset end of said shelf of said connecting unit being adapted to extend into the open end of said shelf of said shelf unit, the remainder of said shelf of said connecting unit providing a continuous planar shelf from said shelf unit to said connecting unit.

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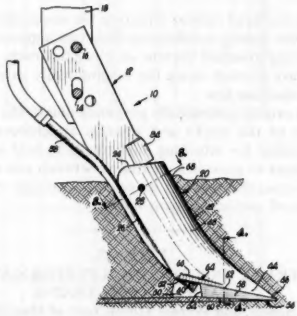
## 3,919,951
## METHOD FOR SUBSOIL APPLICATION

Donald E. Williams, and Forrest F. Robertson, both of Garden City, Kans., assignors to Acra-Plant, Inc., Newton, Kans.

Continuation of Ser. No. 395,587, Sept. 10, 1973, abandoned.
This application Feb. 3, 1975, Ser. No. 546,812
Int. Cl.[2] A01C 23/02
U.S. Cl. 111—7 4 Claims



1. The method of introducing a substance into the soil while advancing in a predetermined direction comprising the steps of:

penetrating the soil down to a preselected level;

making a continuous line cut in the soil along the forwardmost extent of penetration extending upwardly without interruption from said preselected level to the upper surface of the soil;

progressively parting the soil immediately behind the line cut until a slice of predetermined transverse dimensions is produced,

said progressive parting of the soil taking place at a uniform rate of transverse growth along the full length of the line cut until said predetermined transverse dimensions are reached;

forming a small, transversely V-shaped bottom in the slice immediately behind the line cut at said preselected level;

progressively enlarging said bottom both transversely and upwardly at a uniform rate of growth while retaining the bottom transversely V-shaped;

firming up the downwardly converging sides of the bottom simultaneously with said forming and enlarging of the bottom;

discontinuing said enlarging and firming up of the bottom at a point spaced rearwardly from said line cut;

producing a closed top pocket in said bottom between its firmed up sides;

discharging a substance into said pocket and transversely against the firmed up sides immediately behind the point of discontinuance of enlarging and firming up the bottom; and

filling said pocket with soil and allowing the slice to close immediately following discharge of the substance into the pocket.

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3,919,952

## LOOPER OR NEEDLE ECCENTRIC ADJUSTMENT MEANS FOR TUFTING MACHINES

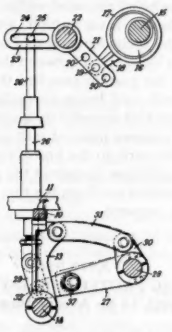
**Ernest Kenneth Lund, Accrington, England, assignor to Edgar Pickering (Blackburn) Limited, Blackburn, England**

**Filed July 11, 1974, Ser. No. 487,751**

**Claims priority, application United Kingdom, July 11, 1973, 32995/73**

**Int. Cl.² D05C** *15/20, 15/22*

**U.S. Cl. 112—79 R** **5 Claims**



1. In a tufting machine, the combination of a machine element mounted for movement to and fro in a predetermined but adjustable stroke, a continuously rotatable drive shaft and an operating linkage for imparting said movement to said machine element from said drive shaft, said operating linkage including a rocking shaft, a duplicated lever comprising a first lever and a second lever each having a first and a second end, first releasable means connecting the first end of the first lever to the rocking shaft, independent second releasable means connecting the first end of the second lever to the rocking shaft, means connecting the second end of the first lever to a member of said operating linkage, and an eccentric stud and slot means interconnecting the second end of the second lever to the first lever, said eccentric stud being rotatable to effect relative angular adjustment of said levers upon release of said first releasable means.

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3,919,953

## APPARATUS FOR TUFTING SPACED ROWS OF LOOP PILE AND CUT PILE

**Roy T. Card, Chattanooga, and Rodney E. Hill, Hixson, both of Tenn., assignors to Card & Co., Inc., Chattanooga, Tenn.**

**Filed Oct. 16, 1974, Ser. No. 515,171**

**Int. Cl.² D05C** *15/22, 15/24*

**U.S. Cl. 112—79 R** **10 Claims**

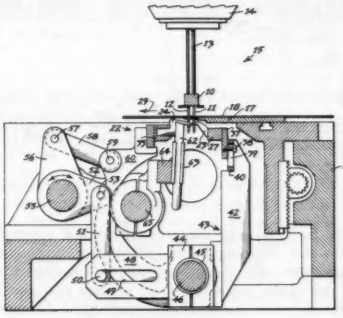
1. A tufting machine for forming spaced rows of loop pile stitching and cut pile stitching having means for supporting a base fabric for longitudinal movement in a feeding direction through said machine, comprising:

a. a plurality of first and second reciprocal needles for introducing yarns through the base fabric to form loops, said needles being spaced apart substantially transversely of the feeding direction,

b. a looper apparatus comprising a plurality of loop pile hooks and a plurality of cut pile hooks, there being one hook for each of said needles,

c. said looper apparatus comprising means mounting said loop pile hooks adjacent said fabric supporting means so that the bills of said loop pile hooks point in said feeding direction and each of said loop pile hooks cooperates with a first said needle to form a loop pile loop,

d. said looper apparatus further comprising means mounting said cut pile hooks adjacent said fabric supporting means so that the bills of said cut pile hooks point in the direction opposite said feeding direction and each of said



cut pile hooks cooperates with a second said needle to form a cut pile loop,

e. a knife for each cut pile hook,

f. means supporting each said knife for reciprocal cooperative movement with a corresponding cut pile hook to cut a cut pile loop and form a cut pile tuft,

g. said looper apparatus further comprising reciprocal motive means for moving said loop pile hooks and said cut pile hooks simultaneously toward each other to cooperate with said respective first and second needles in a lowermost reciprocal position penetrating the base fabric to form said respective loops, and for moving said loop pile hooks and said cut pile hooks simultaneously away from each other when said first and second needles are in an elevated position to release and cut said respective loops.

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3,919,954

## APPARATUS AND METHOD FOR HANDLING AND PROCESSING GREEN WOOD VENEER IN THE MANUFACTURE OF PLYWOOD

**Fred W. Fields, Portland, Oreg., assignor to The Coe Manufacturing Company, Painesville, Ohio**

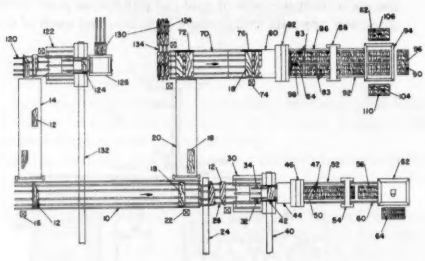
**Continuation of Ser. No. 238,157, March 27, 1972, abandoned, which is a continuation-in-part of Ser. No. 118,850, Feb. 25, 1971, abandoned. This application July 5, 1974, Ser. No. 485,826**

**Int. Cl.² D05B** *33/00;* **B32B** *7/08*

**U.S. Cl. 112—121.29** **2 Claims**

1. An apparatus for unitizing pieces of green veneer and making core sheets for plywood panels comprising in combination: first conveyer means for moving a plurality of green fractional and fishtail veneers in a direction transversely of their lengths along a first production path from which the green fractional veneers are removed at a predetermined location; a fishtail saw along first conveyer means downstream from said first predetermined location for producing usable pieces of green veneer from green fishtails carried by said first conveyer means; a first crowder mechanism along said first conveyer means for arranging the pieces of green veneer in close side-by-side relation; a first stitcher mechanism down-

stream from said first crowder mechanism for stitching with thread the pieces of green veneer into a green veneer ribbon; a first clipper mechanism downstream from said first stitcher mechanism for cutting the green ribbon transversely of its length into sheets of a size larger than the plywood panels being manufactured in order to allow for shrinkage when the green veneer sheets are subsequently processed through a dryer; a second conveyer means for receiving the green fractional veneers removed from said first conveyer means and moving the green fractional veneers along a path of travel; a second crowder mechanism along said second conveyer



means for arranging the green fractional veneers in close side-by-side relation; a second stitcher mechanism downstream from said second crowder mechanism for stitching with thread the green fractional veneers into a second green veneer ribbon; a second clipper mechanism downstream from said second stitcher mechanism for cutting the second green veneer ribbon into green sheets of a size larger than the plywood panels being manufactured in order to allow for shrinkage when the green veneer sheets are subsequently processed through a dryer; and a veneer dryer arranged to receive the green veneer sheets from said first and second clipper mechanisms.

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**3,919,955**

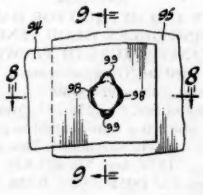
**METHOD AND CRIMPING TOOL FOR PERMANENTLY JOINING TOGETHER TWO SHEET METAL MEMBERS**

**Arthur C. DuVernay, Algonac, Mich., assignor to Auto-Craft Tool & Die Company, Algonac, Mich.**

**Filed July 26, 1974, Ser. No. 492,155**

**Int. Cl.² B21D *39/03***

**U.S. Cl. 113—1 N** **5 Claims**



**1.** A crimping tool for fastening at least two sheets of material together, comprising:

a. a frame member:

b. die means mounted on said frame member and having a workpiece supporting station for supporting at least two overlapping sheets of material thereon including a fixed retainer plate and a movable retainer plate;

c. a first cylindrical punch tool mounted in said die means and having an operative flat end normally biased against the lowermost sheet of material mounted on said die means, and being movable a predetermined distance away from the lowermost sheet of material during a crimping operation;

d. a second cylindrical punch tool movably mounted on said frame member for engagement with the uppermost sheet of material mounted on said die means;

e. power means mounted on said frame member and being connected to said second punch tool for moving the operative end of said second punch tool against said sheets of material on the die means and to punch a portion from the uppermost sheet of material into the lowermost sheet of material for crimping the two sheets of material together;

f. the operative end of said second punch tool being flat and provided with a pair of diametrically disposed notches to form a locking tab between the uppermost sheet of material and the portion punched from said uppermost sheet of material;

g. said first punch tool being movable in conjunction with the second punch tool away from the lowermost sheet of material a distance substantially equal to the thickness of the lowermost sheet of material to allow a portion of the lowermost sheet of material to be punched therefrom when the portion of the uppermost sheet of material is punched into the lowermost sheet of material;

h. the die means being provided with a pair of diametrically disposed relieved areas which are aligned with the notches on the second punch tool and which are operative to form a locking tab between the lowermost sheet of material and the portion punched therefrom;

i. said first punch tool being normally biased against the lowermost sheet of material by a spring means; and,

j. the movable retainer plate of said die means being movable perpendicularly to the line of punching force during a punching operation to permit the portion of the material being punched out from the two sheets of material to flow laterally outward.

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**3,919,956**

**LIGHTNING PROTECTION INSTALLATION**

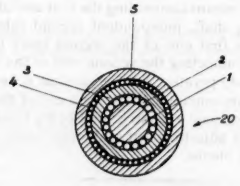
**Cesare G. Invernizzi, 14 bis Avenue Dumas, Geneva, Switzerland**

**Filed Mar. 14, 1972, Ser. No. 234,614**

**Claims priority, application Switzerland, Mar. 18, 1971, 3961/71**

**Int. Cl.² B63B *35/00*; H02G *13/00***

**U.S. Cl. 114—.5 R** **4 Claims**



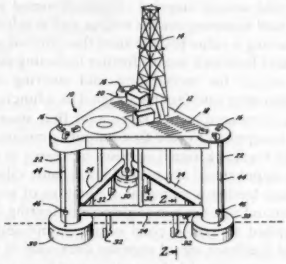
**1.** In a lightning protection installation including a lighting rod, a ground, and a conductor operatively attached to and extending between said lightning rod and said ground for grounding said lightning rod, the improvement wherein:

said conductor comprises a conductor core connected to said lightning rod and to said ground; an outer conducting sheath coaxially surrounding said conductor core and extending along substantially the entire length thereof, said outer conducting sheath being connected to said ground and; insulating means between said conductor core and said outer conducting sheath and extending the entire length of said outer conducting sheath.

## 3,919,957
## FLOATING STRUCTURE AND METHOD OF RECOVERING ANCHORS THEREFOR

**Donald R. Ray, and James D. Bozeman, both of Houston, Tex., assignors to The Offshore Company, Houston, Tex.**

**Filed Apr. 15, 1974, Ser. No. 460,707**
**Int. Cl.² B63B** *35/44*
**U.S. Cl. 114—.5 D** **21 Claims**



1. A floating structure comprising

a platform having a deck and at least three vertical hollow legs depending below said deck and horizontal members extending between the lower ends of said legs,

at least three anchors, each anchor being adapted to be positioned under one of said legs,

means for ballasting and deballasting each of said legs,

means for connecting said anchors to said platform,

means for ballasting and deballasting each of said anchors, and

said anchors when deballasted exerting sufficient buoyancy force to support substantially all of said platform above water with only the anchors creating drag resisting movement of the structure in the water,

said platform having sufficient buoyancy to exert a tension on the anchor connecting means for each anchor at least equal to the weight of said anchor,

said anchors being movable downward from said legs for engagement with the bottom and having said connecting means extending from said anchors to said legs as a plurality of parallel tension lines without any non-parallel lines,

said anchor deballasting means being associated with said legs and operative only when said anchor is in close spaced relationship to the lower end of its leg.

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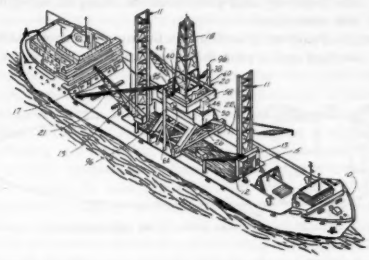
## 3,919,958
## DEEP OCEAN MINING SHIP

**John R. Graham, Newport Beach, and Robert C. Crooke, Corona Del Mar, both of Calif., assignors to Global Marine, Inc., Los Angeles, Calif.**

**Filed June 13, 1974, Ser. No. 479,092**
**Int. Cl.² B63B** *35/44*
**U.S. Cl. 114—.5 D** **11 Claims**

1. A mining ship for lowering, operating and raising subsea mining apparatus, comprising a hull including a deck and having an opening extending vertically through the hull to provide access from the deck to the water below the hull, a frame mounted on the hull and bridging the opening, a two-axis gimbal system including an outer gimbal ring and an inner gimbal frame pivotally mounted on the outer gimbal ring, means pivotally mounting the outer gimbal ring on the bridging frame over the opening, and pipe lifting means mounted on the inner gimbal frame for raising and lowering mining apparatus through the opening, said means supporting the outer gimbal ring on the bridging frame including heave compensating means for controlling vertical movement of the



gimbal system relative to the bridging frame in response to vertical movement of the ship.

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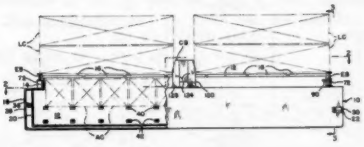
## 3,919,959
## BARGE WITH RELEASABLE SUPPORTS

**Frank A. Nemec; Stuart W. Thayer, both of New Orleans; William S. Eckert, Kenner; Marion F. Horn, Metairie, and Roland J. Dunn, Jr., Covington, all of La., assignors to Lykes Bros. Steamship Co., Inc., New Orleans, La.**

**Division of Ser. No. 234,774, March 15, 1972, Pat. No. 3,810,177. This application Jan. 18, 1974, Ser. No. 434,588**
**Int. Cl.² B63B** *25/38*
**U.S. Cl. 114—26** **2 Claims**



1. A cargo container carrying barge having a bottom, longitudinally extending sidewalls, and end walls defining a hold; hatch means for said hold through which cargo containers may be loaded and unloaded; and hatch cover means extending substantially across the width of said barge, said barge further comprising:

releasable support beams for supporting at least one horizontal tier of cargo containers above said hatch cover means, at least one of said beams being elevated above the top of and spanning said hatch cover means in a direction athwart said barge

container guide means arranged in pairs along each beam and being spaced apart a distance generally corresponding to the width of the container to be supported by the beam; one of said beams having a length greater than the width of a container to be supported thereon, and

securing means for releasable securing of said support beams to said barge.

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## 3,919,960
## CONVERTED SHIP AND METHOD OF CONVERTING

**Walter J. Amoss, Jr., New Orleans, La., assignor to Lykes Bros. Steamship Co., Inc., New Orleans, La.**

**Filed Mar. 6, 1974, Ser. No. 448,561**
**Int. Cl.² B63B** *3/04*
**U.S. Cl. 114—77 R** **8 Claims**

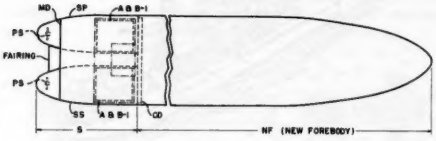
7. A self-propelled ship comprising:

a single forebody structure integrally joining a pair of non-detachable juxtapositioned stern sections;

said stern sections being converted from conventional ships;

the combination of said stern sections and said forebody structure forming a single vessel with the main deck of the forebody and stern sections being at substantially the same level;

each of said stern sections including a separate machinery section and a propulsion system;




said forebody structure extending immediately fore of the machinery sections and being substantially greater in length than said stern sections;

and a substantial portion of the space between said stern sections being enclosed by fairing; said fairing extending from a point corresponding to the aft end of the forebody, aft and upwardly toward the stern to a point generally corresponding to the water line of said ship.

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**3,919,961**

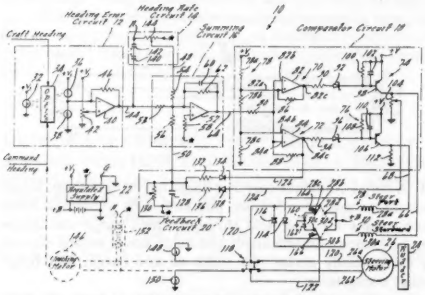
## AUTOPILOT SYSTEM

**John A. McDougal, 2314 E. Court St., Flint, Mich. 48503**

**Filed Apr. 17, 1974, Ser. No. 461,520**

**Int. Cl.[2] B63H *25/24*; G05B *11/28*, *11/42***

**U.S. Cl. 114—144 E** **36 Claims**




1. An autopilot system for a craft having a steering system including a prime moving means which is selectively operative to steer the craft in one direction in response to a first steering command signal and in an opposite direction in response to a second steering command signal, said autopilot system comprising: directional error means for developing a direction error signal representative of deviation of the actual craft direction from a desired command direction; comparator means including a first output command channel for supplying said first steering command signal and a second output command channel for supplying said second steering command signal; feedback means operatively coupled with both output command channels for supplying a feedback signal representative of said steering command signals; summing means operatively coupled with said direction error means and said feedback means for supplying a summing means output signal representative of the algebraic summation of said feedback signal and said direction error signal; said comparator means further including a first comparator operatively coupled with said summing means and said first command channel for comparing said summing means output signal with a first reference signal and for supplying said first steering command signal to said first output command channel when the value of said summing means output signal exceeds the value of said first reference signal and for maintaining said first steering command signal so long as the value of said summing means output signal exceeds a lower limit having a value less than the value of said first reference signal; said comparator means further including a second comparator means operatively coupled with said summing means and said second output command channel for comparing said summing means output signal with a second reference signal and for supplying said second steering command signal to said second command channel when the value of said summing means output signal is less than the value of said second reference signal and for maintaining said second steering command signal so long as the value of said summing means output signal is less than an upper limit having a value greater than the value of said reference signal; said feedback means further including pulse width modulation means for modulating said steering command signals by generating said feedback signal as a function of said first steering command signal when said first steering command signal is supplied to said first output command channel such that said feedback signal opposes increases in said summing means output signal above said lower limit value, and by generating said feedback signal as a function of said second steering command signal when said second steering command signal is supplied to said second output command channel such that said feedback signal opposes decreases in said summing means output signal below said upper limit value.

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**3,919,962**

## RUDDER ARRANGEMENTS FOR SHIPS

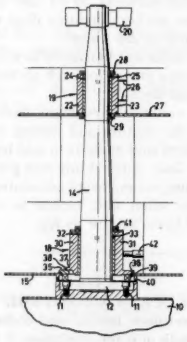
**George F. Clay, Hoylake, England, assignor to Turnbull Marine Design Company Limited, Sale, England**

**Continuation of Ser. No. 287,871, Sept. 11, 1972, abandoned. This application Jan. 16, 1975, Ser. No. 541,630**

**Claims priority, application United Kingdom, Sept. 13, 1971, 42666/71; Sept. 13, 1971, 42667/71**

**Int. Cl.[2] B63H *25/38***

**U.S. Cl. 114—169** **10 Claims**

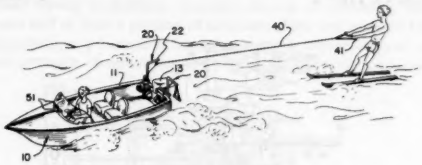


1. A rudder arrangement for ships, which arrangement comprises two associated members, one of said associated members being the rudder of the ship, a substantially vertically disposed shaft connected to a first of said associated members, a plurality of bearing parts together comprising a vertically disposed split bearing in which said shaft is journalled for rotation, said split bearing being split axially, support means connected with said shaft to axially support one of the two associated members, means operable to connect each of said plurality of bearing parts to the second of said associated members, and said means operable to remove at least one of said bearing parts in vertically disposed position radially outwardly from said shaft to enable inspection of said shaft while the ship is afloat.

## 3,919,963
## WATER SKI ROPE REWINDER

William G. Cox, III, Dawson, Ga., assignor to Harold C. Thompson, Dawson, Ga.

Filed Aug. 27, 1974, Ser. No. 500,961
Int. Cl.[2] B63B 21/00
U.S. Cl. 114—235 WS 4 Claims

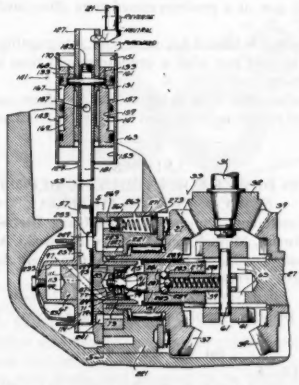



1. Apparatus for mounting a water ski tow rope on a boat having a longitudinal axis comprising a davit having an elongated substantially straight first portion and a second portion disposed out of the plane of said first portion, bracket means for swingably mounting the first portion of said davit on the boat along a generally vertical axis, a resilient member having one portion attached to the first portion of said davit and another portion attached to a fixed structure to urge the second portion of said davit toward a position outwardly of the boat and generally normal to the longitudinal axis thereof, first stop means carried by said bracket means, second stop means mounted on said davit and cooperating with said first stop means to permit limited swinging movement of said davit relative to said bracket means, and a water ski tow rope connected to the second portion of said davit, whereby a pulling force applied to said tow rope by a skier swings said second portion of the davit to a position substantially parallel with the longitudinal axis of the boat against the force exerted by said resilient member to reduce the jerk transmitted to the skier and said resilient member returns said second portion of the davit to an outwardly extending position when the tow rope is released by the skier.

## 3,919,964
## MARINE PROPULSION REVERSING TRANSMISSION WITH HYDRAULIC ASSIST

Marcus W. Hagen, Kenosha, Wis., assignor to Outboard Marine Corporation, Waukegan, Ill.

Continuation of Ser. No. 249,905, May 3, 1972, abandoned. This application Aug. 12, 1974, Ser. No. 496,650
Int. Cl.[2] B63H 5/12, 21/28
U.S. Cl. 115—34 R 27 Claims

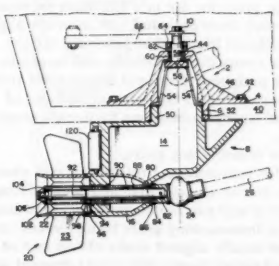


1. A marine propulsion device comprising a propulsion unit, means adapted to be mounted to a boat hull and connected to said propulsion unit for providing horizontal and vertical swinging movement of said propulsion unit relative to said means adapted to be mounted on a boat hull, a propeller shaft rotatably mounted in said propulsion unit, a propeller carried by said propeller shaft, a drive shaft rotatably mounted in said propulsion unit, a reversing transmission connecting said drive shaft to said propeller shaft and shiftable between a neutral condition and a drive condition and including a clutch dog mounted on said propeller shaft for common rotary movement with said propeller shaft and for axial movement relative to said propeller shaft, a mechanical linkage extending is said propulsion unit and connected to said reversing transmission for operating said reversing transmission in response to movement of said mechanical linkage, said linkage including a member carried by said propeller shaft for common rotary movement with said propeller shaft and for axial movement relative to said propeller shaft and connected to said dog for common movement therewith, a rod supported by said propulsion unit for movement transversely of said member, and means mechanically connecting said rod and said member for effecting movement of said member in one direction axially of said propeller shaft in response to movement of said rod in one direction transversely of said propeller shaft and for effecting movement of said member in the other direction axially of said propeller shaft in response to movement of said rod in the other direction transversely of said propeller shaft and for simultaneously permitting rotary movement of said member relative to said rod.

## 3,919,965
## BOAT PROPELLER MOUNTING AND STEERING MECHANISM

Charles R. Ross, Seattle, Wash., assignor to Robertson Ross, Seattle, Wash.

Continuation of Ser. No. 194,706, Nov. 1, 1971, abandoned. This application July 16, 1973, Ser. No. 379,733
Int. Cl.[2] B63H 5/12
U.S. Cl. 115—35 2 Claims



1. A boat propeller mounting device wherein the propeller rotates about a first axis generating thrust urging the boat in a direction of desired travel and a portion of the mounting device pivots about a vertical axis for steering the boat, said mounting device comprising:

an elongated, hollow lower housing adapted to be positioned below the bottom portion of the boat hull and having an upper portion thereof extending upwardly through the hull, a propeller shaft positioned in and extending from the lower portion of said lower housing at opposite ends thereof, a propeller mounted on the rearward end of said shaft, and an exhaust exit port allowing communication between the interior and exterior of said lower housing;

a hollow upper housing secured within the interior of the hull and means pivotally securing said upper portion of the lower housing within said hollow upper housing, an opening in the top of said upper housing and extension means on the upper portion of the lower housing extend-

ing through and above said opening, steering control means secured to the extension means at a point above the upper housing and providing means for pivoting the lower housing relative to the upper housing, and an exhaust inlet port for allowing exhaust gas flow into the hollow interiors of said upper and lower housings and out said exit port; and

propeller driving means positioned within the hull and connecting means extending from the propeller driving means and joined to the forward end of the propeller shaft by a universal joint positioned below the bottom of the hull in line with the pivot axis of said lower housing.

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## 3,919,966
## CHANNEL INDICATOR

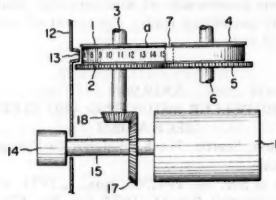
**Shigeto Saruwatari, Chigasaki, Japan, assignor to Matsushita Electric Industrial Co., Ltd., Osaka, Japan**

**Filed Dec. 14, 1972, Ser. No. 315,079**

**Claims priority, application Japan, Dec. 17, 1971, 46-120035[U]**

**Int. Cl.[2] H03J** *1/02*

**U.S. Cl. 116—124.1 A** **5 Claims**



1. A channel indicator having a channel selection shaft in detent-type tuner for use in a television receiver comprising

a first rotary drum provided with an axially aligned shaft and a peripheral frictional engagement surface,

a second rotary drum provided with an axially aligned shaft and a peripheral frictional engagement surface, said peripheral frictional engagement surfaces of said first and second rotary drums being frictionally engaged with each other,

a pair of intermeshing gears,

means for transmitting a rotation of said channel selection shaft to one of said first and second rotary drums by means of said pair of intermeshing gears, each gear of said pair of intermeshing gears being directly coupled to one of said axially aligned shafts of said one of said first and second rotary drums and to said channel selection shaft, respectively,

a channel indicating tape upon which a plurality of codes representing channel numbers are printed in equidistantly spaced-apart relation, one end of said tape being fixed to said first drum and the other end of said tape being fixed to said second rotary drum, said tape being wound around at least one of said drums a plurality of turns,

said peripheral frictional engagement surfaces of said drums being spaced from said surfaces about which said tape is wound,

an indicating window formed in said television receiver for indicating one of said plurality of codes and provided in close proximity to the surface of said channel indicating tape wound around the first drum so as to make one of said plurality of codes easily visible, and

means for indicating a channel number representing a selected channel of a plurality of channel indicating codes visible in said indicating window at every selected stop position of said channel selection shaft of said detent-type tuner.

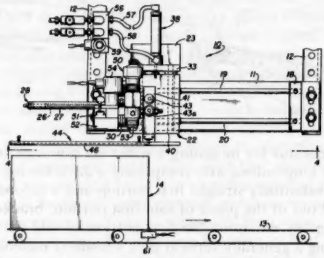
## 3,919,967
## TRAVERSING PRINTER

**Walter B. Warning, Chicago, and Walter B. Warning, Jr., Schaumberg, both of Ill., assignors to Automation Development and Engineering Corporation, Elk Grove Village, Ill.**

**Filed Apr. 22, 1974, Ser. No. 462,617**

**Int. Cl.[2] B05C** *11/00, 5/00;* **B05B** *15/04*

**U.S. Cl. 118—2** **2 Claims**



1. Apparatus for applying a predetermined pattern of liquid onto each of a plurality of articles being transported seriatim by a continuously travelling conveyor, the combination comprising

a gun for emitting a spray of said liquid,

means mounting said gun adjacent the path of movement of said articles for spraying said liquid onto said articles,

a mask apertured in the shape of said predetermined pattern,

a carriage mounted for movement in a direction parallel to said conveyor between a first position and a second position adjacent said path,

means mounting said mask to said carriage for movement toward and away from the path of said articles,

mask moving means moving said mask into selective engagement with said articles as they move along said path, means moving said carriage between said first and second positions while said mask is in engagement with one of said articles,

means responsive to an article being located at a predetermined position on said conveyor for providing an initiating signal,

first adjustable time delay means responsive to said initiating signal for operating said mask moving means to move said mask against said article,

second adjustable time delay means for initiating operation of said gun at a predetermined time after said initiating signal,

third adjustable time delay means for interrupting the operation of said gun after a predetermined time interval of operation, and

fourth adjustable time delay means for then causing said control means to move said mask away from said article.

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## 3,919,968
## REACTION DEVICE FOR PYROLYTIC DEPOSITION OF SEMICONDUCTOR MATERIAL

**Herbert Sandmann, Vaterstetten; Wolfgang Dietze, Munich; Ulrich Rucha, Munich, and Gerhard Barowski, Munich, all of Germany, assignors to Siemens Aktiengesellschaft, Berlin & Munich, Germany**

**Filed Nov. 20, 1974, Ser. No. 525,640**

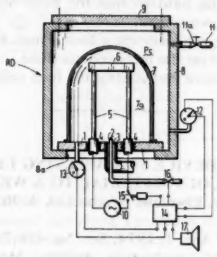
**Claims priority, application Germany, Nov. 29, 1973, 2359563**

**Int. Cl.[2] C23C** *13/08*

**U.S. Cl. 118—5** **9 Claims**

1. In a reaction device for the deposition of a semiconductor material onto a heated surface from a reaction gas having a gaseous compound of said semiconductor material therein,

including a base plate having means for supporting at least one pair of spaced-apart mandrels which are electrically interconnected with an operational current source capable of heating said mandrels to a select temperature, a dome composed of a glass-like material and positioned in contact with said base plate so as to enclose a reaction chamber about said mandrels, means for supplying a pressurized reaction gas from a source thereof to said reaction chamber, a pressure-resistant container having a pressure chamber therein surrounding said dome and at least a portion of said base plate and a means for suppplying a pressurized inert gas from a source thereof to said pressure chamber for applying a gas pressure onto said



dome to hold said dome in a gas impermeable relation with said base plate; the improvement comprising:

a pressure-sensing control means operationally interconected between said operational current source and said mandrels and between said pressure chamber and said means for supplying a pressurized reaction gas from a source thereof to said reaction chamber so that when the pressure within said pressure chamber drops below a predetermined minimum value said control means generate a signal to block the current flow to said mandrels and generate a signal to block the reaction gas flow to said reaction chamber.

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**3,919,969**

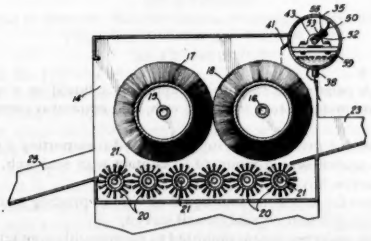
**PRODUCE COATING MACHINE HAVING VISCOUS LIQUID DISPENSING MEANS**

**William H. Leverett, Greenville, Ga., assignor to Durand-Wayland, Inc., LaGrange, Ga.**

**Filed Apr. 8, 1974, Ser. No. 458,533**

**Int. Cl.² B05C *1/02***

**U.S. Cl. 118—13** **10 Claims**



**1.** A machine for coating agricultural produce with a liquid and comprising a frame; an applicator mounted to said frame for rotation about an axis; applicator drive means for rotating said applicator about said axis; produce guide means for guiding produce into contact with said applicator; a reservoir mounted to said frame and adapted to be filled to a preselected level with liquid and with said reservoir having a wall rising above said preselected level and defining at least one port elevated above said preselected level and said applicator; sweeping means mounted for movement within said reservoir; sweep drive means for moving said sweeper means over said wall from beneath said preselected level to above said preselected level adjacent said port for lifting only a portion of said liquid along said wall and for urging the same out of said port; and liquid guide means for guiding liquid passing through said port onto said applicator, the contour of said wall being such that said sweep means will urge the liquid along said wall and through said port to emerge as liquid which adheres to said wall and is received on said liquid guide means and will thereafter drip therefrom onto said applicator.

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**3,919,970**

**APPARATUS FOR THE CONTINUOUS APPLICATION OF GLUE**

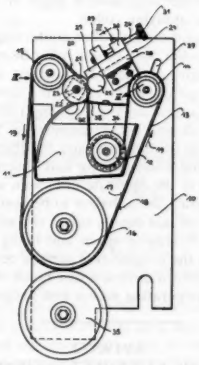
**Ulrich Spielvogel, Lenneper Strasse 13, 5630 Remscheid, Germany**

**Filed May 13, 1974, Ser. No. 469,501**

**Claims priority, application Germany, May 17, 1973, 2324884**

**Int. Cl.² B05C *1/14***

**U.S. Cl. 118—203** **10 Claims**



**1.** Apparatus for the continuous application of glue to an element comprising,

a body portion having a glue container mounted thereon, said glue container having an open top portion,

a feed roller rotatably mounted in said glue container,

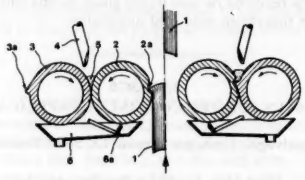
an applicator roller rotatably mounted on said body portion in spaced relation to said glue container and defining the location for glue application to an element, and

an endless band reeved about said feed roller and said applicator roller and having a width greater than the widths of said feed roller and said applicator roller to prevent glue from being deposited on the surface of said feed and applicator rollers, said endless band arranged to pick up glue on a surface thereof as said band moves around said feed roller in said glue container and deposit said glue on an element positioned in juxtaposition with a portion of said band reeved about said applicator roller.

## 3,919,971
## GLUING APPARATUS

**Hermann Lubeck, Espelkamp, Frotheim, Germany, assignor to August Kolbus, Wesphalia, Germany**

**Filed June 26, 1974, Ser. No. 483,425**
**Claims priority, application Germany, Mar. 7, 1974, 7407955**
**Int. Cl.² B05C** *1/02*
**U.S. Cl. 118—259** **8 Claims**



1. Apparatus for applying an adhesive to the outer leaf of an inner book comprising:

an adhesive applying roller, said applying roller contacting an outer leaf of an inner book to be coated for transferring adhesive thereto, said applying roller being characterized by an axis-parallel recess on the roller surface which corresponds to a hinge surface portion on the book to be ocated, said recess flaring to the normal surface of the applying roller at a shallow angle in the direction of rotation of the applying roller;

a dosing roller, said dosing roller contacting the surface of said applying roller, said dosing roller being characterized by an irregularity on the roller surface, said irregularity on said dosing roller surface being complimentary in shape to said recess on the applying roller surface, said applying and dosing rollers defining a V-shaped space above the point of minimum spacing therebetween;

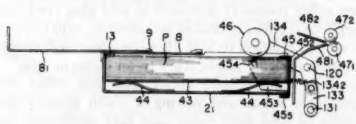
means for rotating said applying and dosing rollers in synchronism and in the opposite direction; and

means for delivering the adhesive to be applied to the book to the surface of said dosing roller, the adhesive accumulating in said V-shaped space and being able to escape from between the cooperating surface recess and irregularity in the upward direction as a result of the configuration of said cooperating recess and irregularity.

## 3,919,972
## AUTOMATIC CUT SHEET FEEDING UNIT

**Shigehiro Komori; Hisashi Sakamaki, both of Yokohama; Hiroyuki Hattori, Mitaka; Toshihide Iida; Koichi Miyamoto, both of Tokyo, and Kazumi Umezawa, Yokohama, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan**

**Filed May 23, 1972, Ser. No. 256,125**
**Claims priority, application Japan, June 4, 1971, 46-46702; June 8, 1971, 46-40415**
**Int. Cl.² B65H** *1/12, 3/56*
**U.S. Cl. 271—118** **6 Claims**



1. An automatic cut sheet feeding unit comprising in combination,

a box type body, said box type body comprising

a separation pawl on top of each forward corner section thereof, the separation pawl being movable between a fixed upper and variable lower positions relative to the box type body,

an intermediate plate which carries a stack of cut sheets and is accommodated in the box type body,

spring means between the box type body and the intermediate plate and used to press the cut sheets loaded on the intermediate plate against the bottom face of the separation pawls in the fixed upper position,

a feed roller mounted to be movable between a position out of contact with the stack, in which position the spring means urges the stack against the pawl and forces the pawl to its fixed upper position and a feeding position in pressure contact with the stack and below the upper fixed position of the pawl so that the pawl rests against the stack by its own weight,

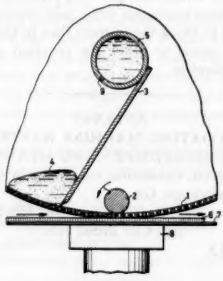
said feed roller, on receiving a feed signal, feeding the cut sheets loaded on the intermediate plate,

and means to drive and control the feed roller.

## 3,919,973
## SQUEEGEE DEVICE FOR APPLYING LIQUID OR VISCOUS MATERIAL TO A WEB

**Johannes Zimmer, Ebentaler Strabe 133, A-9020 Klagenfurt, Austria**

**Filed Apr. 1, 1974, Ser. No. 456,767**
**Claims priority, application Austria, Mar. 30, 1973, 2842/73**
**Int. Cl.² B05C** *3/00;* **B41F** *15/08*
**U.S. Cl. 118—406** **5 Claims**



1. A printing apparatus for applying a liquid or viscous printing material to a traveling web, said apparatus comprising:

a moving printing base supporting and transporting a web;

a stencil screen mounted in contact with said web, said screen having therein perforations;

means for supplying said liquid or viscous printing material to a position on said stencil screen;

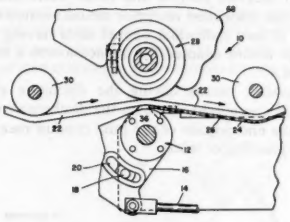
blade squeegee means mounted to permanently contact said stencil screen for pressing said liquid or viscous printing material into but not through said perforations in said stencil screen; and

roller squeegee means permanently contacting said stencil screen at a position downstream of said blade squeegee means, as viewed in the direction of travel of said web, for pressing said liquid or viscous printing material positioned in said perforations through said perforations onto said web.

## 3,919,974
## HOT MELT EXTRUSION APPARATUS

**Peter Herzog, Chemin du Martinet, Switzerland, assignor to Bolton-Emerson, Inc., Lawrence, Mass.**

**Filed Nov. 9, 1973, Ser. No. 414,519**
**Int. Cl.[2] B05C** *3/12*
**U.S. Cl. 118—410** **1 Claim**



1. Apparatus for coating the underside of a web advancing at a predetermined rate along a generally horizontal path, said apparatus comprising:

a press roll mounted at each opposite end in fixed bearings to extend transversely of said web above said path for guiding and supporting said web in an unchanging said path during splicing thereof;

coating head means, mounted at each opposite end in support pivots, to extend transversely of said web under said path, for forming a coating nip therewith, said means including actuating mechanism for independently pivoting one said end relative to the other to skew said head relative to said roll to control coating thickness,

said coating head having an elongated lead-on lip and an elongated, rounded, lead-off lip removably mounted thereon and jointly defining a narrow extrusion slot connecting with a central feed plenum chamber, said slit and chamber being free of obstructions and free of gap adjustment screws in the path of extrudate emerging from said slit;

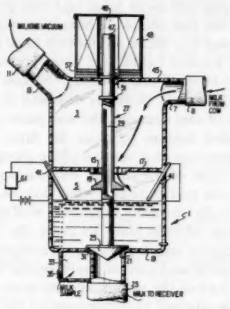
said lead-off lip being flexible and distortable along its length and said head including a plurality of spaced threaded screws therealong forming means to push and pull said lead-off lip to vary the width of said slit and control the thickness of coating extruded therefrom.

## 3,919,975
## MILKER UNIT

**Lloyd P. Duncan, Rainbow Drive, Washington, Mo. 63090**

**Filed Aug. 5, 1974, Ser. No. 494,962**
**Int. Cl.[2] A01J** *5/00*
**U.S. Cl. 119—14.05** **8 Claims**

1. A milker unit comprising a double chambered container, including an upper chamber positioned over a lower chamber, said upper chamber being connected to milk conduit means which conveys milk to said upper chamber, said lower chamber having a valved outlet at the lower portion thereof connected to a milk collector line, a source of vacuum being in communication with the interior of said upper chamber through a vacuum line, and an opening in the bottom of the upper chamber leading to the interior of said lower chamber, a first valve being seatable on said opening and connected to a second valve that is normally seated on said outlet in the lower chamber, said valves being interconnected by common stem means, whereby the seating of said first valve unseats said second valve and vice versa, said stem means extending upwardly through both chambers to a solenoid, electrical means in said lower chamber for sensing the level of milk in that chamber and signalling said solenoid means to raise said stem means and simultaneously move said valves responsive to a predetermined level of milk, whereby said second valve is unseated and milk drains from the container through said

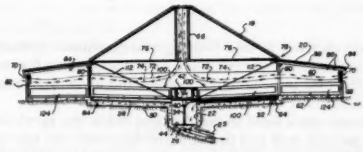


outlet while said first valve seats and milk collects in the upper chamber.

## 3,919,976
## LIVESTOCK ENCLOSURE

**Clarence J. Meyer, and Daniel J. Meyer, both of Rural Rte. No. 1, Monona, Iowa 52159**

**Filed July 10, 1974, Ser. No. 487,009**
**Int. Cl.[2] A01K** *1/00*
**U.S. Cl. 119—16** **20 Claims**



1. A livestock enclosure comprising:

a generally-circular upright wall enclosing a livestock raising area;

a roof covering the area enclosed by said wall;

a pit located centrally of said area and extending beneath the level of the lower perimeter of said wall;

an annular imperforate floor beneath said roof and exposed for direct access to and walking upon by said livestock, said floor extending outwardly from the upper perimeter of said pit toward said wall;

an elongated, radially extending sweep means, pivotally mounted at the center of said pit for lateral movement circularly around and over said floor, for engaging litter on said floor and propelling said litter toward and into said pit;

means for driving said sweep means in said movement and in said propelling of said litter;

means for draining said pit to a location outside of said enclosure;

valve means for selectively closing said draining means; and means for agitating litter deposited within said pit.

## 3,919,977
## SEED FEEDING DEVICE FOR BIRDS

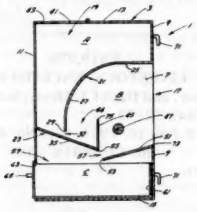
**Robert Bruce Clark, 1100 McGregor St., Apt. 714, Montreal, Quebec, Canada**

**Filed June 13, 1974, Ser. No. 478,849**
**Int. Cl.[2] A01K** *39/00*
**U.S. Cl. 119—18** **5 Claims**

1. A seed feeding device for birds comprising a housing

having an opening trough one side thereof, the said device comprising;

a storage enclosure vertically disposed in the upper part of said housing and away from said side provided with said opening, the said enclosure having an open ended bottom and adapted to contain a relatively large amount of seeds, a trough located below said open ended bottom and at about the level of said opening, the said trough comprising a bottom plate slopingly disposed downwardly in the direction of said opening, the said plate covering the said open ended bottom to close the latter and to leave a narrow aperture in a vertical plane along the lower edge of the bottom of the storage enclosure adjacent the said opening, the said plate extending downwardly beyond the enclosure, an upwardly extending wall secured along the lower edge of said plate to close the said trough, the upper edge of said wall being at a higher level then the upper edge of said narrow aperture, the distance between the said wall of the trough and the said open ended bottom being adapted to accommodate the head of the bird to reach for the seeds in the trough,



a perch fixed to said housing and positioned between said wall and the side provided with said opening for receiving the bird in a standing position and allowing the latter to feed itself in the trough,

a waste plate fixed to said housing below the perch between the said wall and the side provided with the said opening for receiving bird droppings and waste food droppings, the said waste plate being inclined in the direction of the trough, and

collecting means in the lower part of the said housing and below said waste plate for receiving the said droppings sliding down the said inclined plate,

whereby the seeds located in the storage enclosure are supported by the sloping plate of the trough and slide toward the narrow aperture between said plate of the trough and the storage enclosure for slowly and continuously replenishing the lower portion of the trough with seeds, the bird standing on the perch and facing the trough being positioned to retrieve seeds between the front wall and the lower part of the storage enclosure, the waste plate slopingly disposed below the perch being adapted to receive the droppings and to allow them to slide in the waste collecting means.

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**3,919,978**

**DIRECT KENNEL EXHAUST SYSTEM**

**Dora B. Schaefer, New York, N.Y., assignor to Puppy Palace Enterprises, Inc., Lake Saint Louis, Mo.**

**Filed July 10, 1974, Ser. No. 487,144**

**Int. Cl.[2] A01K** *1/02*

**U.S. Cl. 119—19** **4 Claims**

1. In an animal confinement system for use in a confined working space such as the interior of a retail pet store, said confined working space being solely isolated from a fluid discharge zone, such as the atmosphere, the combination of

an animal confinement structure located in or adjacent to said confined working space, said confinement structure including

a plurality of individual kennel units,

said plurality of individual kennel units being carried by a common frame structure,

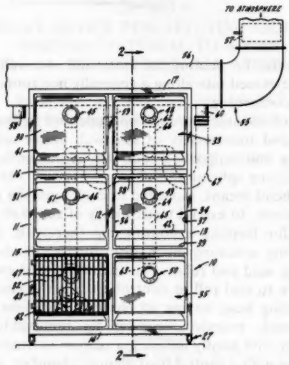
each of said individual kennel units having

firstly, animal retention means for receiving and retaining an animal to be displayed, and

secondly, receptacle means for receiving and retaining odor generating materials such as animal excreta, whereby each kennel unit has a separate excreta receptacle means which receives excreta and other waste materials only from the associated retention means located thereabove, each of said individual kennel units having a fluid discharge means adapted for connection to a fluid conduit means,

fluid conduit means having the discharge end portion thereof communicating with the discharge zone,

the intake end portion of the fluid conduit means comprising a plurality of inlets,



each inlet being connected to an associated kennel unit fluid discharge means

whereby each kennel unit is individually connected into the fluid conduit means irrespective of the number of kennel units comprising said confinement structure,

means associated with the fluid conduit means for evacuating the confinement structure whereby odors in the receptacle means are passed directly to the discharge zone from the confinement structure thereby by-passing the confined working space, and further characterized

firstly, in that means for movably supporting the animal confinement structure are mounted thereto and said animal confinement structure is movable while said fluid conduit means is in communication therewith, and

secondly, in that the fluid conduit means is flexible whereby the fluid conduit means can be operative when the pet confinement structure is moved within the range of movement permitted by the flexible conduit means.

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**3,919,979**

**RUBBING AND LIQUID APPLYING APPARATUS FOR HOGS**

**George W. Keene, P.O. Box 395, Rochelle, Ill. 61068**

**Filed July 31, 1974, Ser. No. 493,263**

**Int. Cl.[2] A01K** *29/00*

**U.S. Cl. 119—157** **13 Claims**

1. A rubbing and liquid applying apparatus for livestock, comprising, in combination:

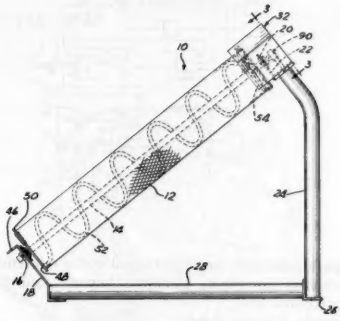
an elongated cylinder having upper and lower end walls, the cylinder defining a reservoir for holding liquid therein;

frame means for supporting said cylinder at an inclined angle and adapted to permit rotation thereof;

a spiral tube positioned in said cylinder and adapted to deliver liquid from the lower end to the upper end thereof in response to rotation of said cylinder in a predetermined direction;

means for limiting rotation of said cylinder to said predetermined direction;

the upper end wall of said cylinder being positioned downwardly from the end thereof to define an upper chamber above said wall, the upper end of said spiral tube extending through said upper end wall so that said liquid is delivered to said chamber when said cylinder is rotated; the side of said cylinder in said chamber having a plurality




of apertures for passing said liquid to the outer surface of said cylinder;

a hollow cylindrical housing secured in said upper end wall and adapted to pass liquid into said reservoir from said chamber; and,

a fitting insertable into said housing and flexible tubing having one end connected to the upper end of said spiral tube and the opposite end thereof adapted to be inserted within said housing, said fitting having an open end and at least one aperture in the side thereof, the depth of insertion of said fitting within said housing alternatively opening and closing said aperture to thereby regulate the flow of liquid into said chamber, the remaining liquid being passed through the end thereof back into said reservoir.

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**3,919,980**

**ROTARY ENGINE**

**Franklin Veatch, Cleveland, Ohio, assignor to The Standard Oil Company, Cleveland, Ohio**

**Filed Mar. 20, 1973, Ser. No. 342,940**

**Int. Cl.[2] F02B** *53/00*

**U.S. Cl. 123—8.45** **14 Claims**

**1.** A rotary engine comprising:

a stator having spaced end walls and a peripheral wall interconnecting the end walls to form a cylindrical cavity having an axis, the inner surface of the peripheral wall having a substantially circular profile;

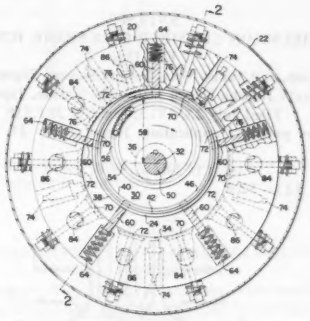
a hollow cylindrical rotor having an outer and inner surface, each having a substantially circular profile, and supported in the cavity for rolling motion with respect to the inner surface of the stator about an axis spaced from but parallel to the stator axis;

the rotor having an internal diameter such that the stator axis is located inside the inner surface of the rotor and an external diameter that is less than the diameter of the inner surface of the stator;

means for sealing the outer surface of the rotor with respect to its inner surface;

an eccentric mounted within the inner surface of the rotor for rotation about the stator axis and having bearing means located on the periphery of the eccentric which are in rolling contact with the inner surface of the rotor, whereby in operation the rotor axis described a substantially circular path around the stator axis;

a plurality of spaced vanes mounted in the stator in sealing relationship with the end walls for reciprocal movement with respect to the inner surface of the stator;




means for holding the vanes in sealing engagement with the outer surface of the rotor;

whereby at least two chambers, at least one of which is a working chamber and one of which is a non-working chamber, are defined by adjacent vanes, the outer surface of the rotor, the inner surface of the stator, and the end walls of the stator;

the stator having an intake port for admitting fuel to the working chamber and an exhaust port for discharging exhaust products from such chamber.

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**3,919,981**

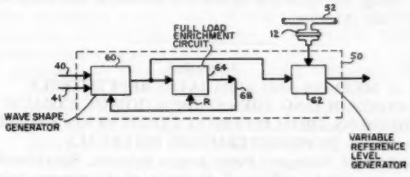
**CIRCUIT FOR PROVIDING ELECTRONIC ENRICHMENT FUEL COMPENSATION IN AN ELECTRONIC FUEL CONTROL SYSTEM**

**Junuthula N. Reddy, Horseheads, N.Y., assignor to The Bendix Corporation, Southfield, Mich.**

**Continuation-in-part of Ser. No. 101,896, Dec. 28, 1970, Pat. No. 3,734,068. This application Jan. 20, 1972, Ser. No. 219,275**

**Int. Cl.[2] F02B** *3/00*

**U.S. Cl. 123—32 EA** **16 Claims**




**1.** In an internal combustion engine fuel control system of the type having an intake manifold for providing air to the engine, sensor means including means for generating a signal indicative of engine load, and computing means responsive to the sensor means for providing a train of fuel delivery command signals varying from an engine speed determined first value to a second value determined at least in part by said signal indicating engine load, the durations of said fuel delivery command signals between said engine speed determined first value and said second valve determining quantities of fuel supplied to the engine, the improvement comprising a full load enrichment circuit having:

means for providing a reference signal representing a predetermined engine load at which the air pressure in the intake manifold is within ten percent of atmospheric pressure; and

means for comparing the reference and load indicating signals and changing the duration of the fuel delivery command signals in response to load indicating signal values having a predetermined relationship with respect to said reference signal.

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**3,919,982**

## COMBUSTION CHAMBER OF A SPARK IGNITION ENGINE

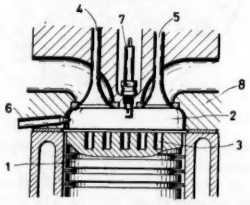
**Kenji Goto, and Takao Niwa, both of Susono, Japan, assignors to Toyota Jidosha Kogyo Kabushiki Kaisha, Japan**

**Filed July 23, 1973, Ser. No. 381,518**

**Claims priority, application Japan, Mar. 21, 1973, 48-39465**

**Int. Cl.² F02B** *19/10, 19/18*

**U.S. Cl. 123—32 E** **6 Claims**




**1.** In the combustion chamber, of a direct fuel injection type spark-ignition internal combustion engine, defined by and between the face of a piston facing a cylinder head and the face of the cylinder head facing the piston, the improvement comprising:

a plurality of uniformly scattered holes in at least one of said piston and cylinder head, each of said holes opening at one end thereof into said chamber and the other end thereof being closed, said holes being adapted to receive air therein upon introduction of air into said chamber, the cross-sectional area of the open end of said holes being no smaller than that of the closed end thereof to let out the air therefrom without causing turbulence in said chamber upon movement of said piston away from said cylinder head; a fuel injector for injecting fuel into a portion of said chamber relatively remote from said holes whereby fuel is prevented from entering said holes; and a spark plug, the spark gap of which is located in said portion of said chamber.

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**3,919,983**

## METHOD AND APPARATUS REPETITIVELY CONTROLLING THE COMPOSITION OF EXHAUST EMISSIONS FROM INTERNAL COMBUSTION ENGINES, IN PREDETERMINED INTERVALS

**Josef Wahl, Stuttgart; Peter Jurgen Schmidt, Schwieberdingen, and Richard Zechnall, Stuttgart, all of Germany, assignors to Robert Bosch GmbH, Stuttgart, Germany**

**Filed Sept. 12, 1973, Ser. No. 396,477**

**Claims priority, application Germany, Sept. 14, 1972, 2245029**

**Int. Cl.² F02B** *3/00*

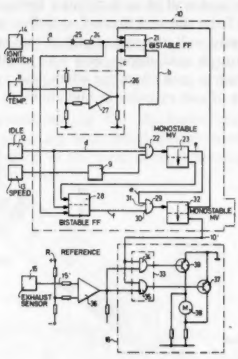
**U.S. Cl. 123—32 EA** **10 Claims**

**1.** Method of controlling the composition of the exhaust gases from internal combustion engines, including the step of controlling the relative proportion (λ) of air and fuel being applied to the engine;

sensing operating parameters of the engine, comprising at least one of: operating time of the engine upon starting, after having been stopped; engine speed; engine operation under idling, or power supplying condition; engine temperature;

sensing composition of the exhaust gases and providing an exhaust output signal representative thereof;

sensing if a predetermined operating condition of the engine prevails for a predetermined time limit;




comparing the exhaust sensed signal with a reference if said operating conditions persisted beyond said predetermined time limit;

generating a timing signal;

and controlling said relative proportion (λ) of air and fuel in accordance with sensed composition, as represented by the exhaust signal, during said timing signal.

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**3,919,984**

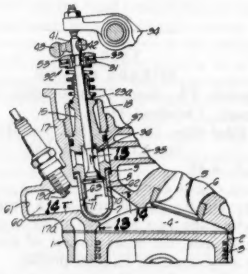
## INTERNAL COMBUSTION ENGINE WITH AUXILIARY CHAMBER HAVING VARIABLE SIZE OPENINGS

**Shizuo Yagi, Asaka, and Kazuo Inoue, Tamashi, both of Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan**

**Filed Jan. 23, 1974, Ser. No. 435,864**

**Int. Cl.² F02B** *16/19, 16/10*

**U.S. Cl. 123—32 SP** **9 Claims**



**1.** In a spark-ignition internal combustion piston engine having a main combustion chamber and an auxiliary combustion chamber connected by a torch nozzle, the combination of: means including a first intake passage for delivering a lean mixture to the main chamber, and means including a second intake passage for delivering a rich mixture to the auxiliary chamber, a spark plug having electrodes positioned in a space communicating with the auxiliary chamber through a restricted opening, an auxiliary intake valve assembly positioned

to control flow through the second intake passage into the auxiliary chamber, said intake valve asembly having a movable valve element, and means on the movable valve element projecting into the auxiliary chamber to vary the effective size of said restricted opening.

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**3,919,985**

## VARIABLE SIZE TORCH NOZZLE FOR INTERNAL COMBUSTION ENGINE

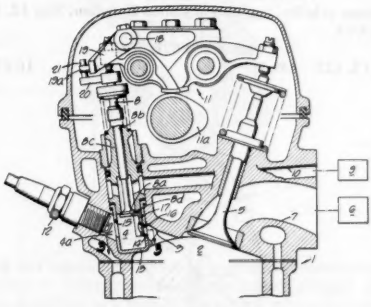
**Shizuo Yagi, Asaka; Yasuhito Sato, Kamifukuoka, and Kiyoshi Miyaki, Asaka, all of Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan**

**Filed Jan. 21, 1974, Ser. No. 434,916**

**Claims priority, application Japan, Feb. 14, 1973, 48-17421**

**Int. Cl.² F02B** *19/10, 19/16*

**U.S. Cl. 123—32 SP** **4 Claims**



**1.** In a spark-ignition internal combustion piston engine having a main combustion chamber and an auxiliary combustion chamber connected by a torch nozzle, and having means including a first intake passage for delivering a lean mixture to the main chamber and means including a second intake passage for delivering a rich mixture to the auxiliary chamber, the improvement comprising, in combination: an auxiliary intake valve assembly positioned to control flow through the second intake passage into the auxiliary chamber, said intake valve assembly having a movable valve element, a skirt on said movable valve element extending into said auxiliary chamber near the torch nozzle, means for moving said valve element axially to open and close said intake valve assembly, and means for turning said movable valve element to cause the skirt to vary the effective size of the torch nozzle.

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**3,919,986**

## OUTPUT CONTROLLING METHOD AND DEVICE FOR INTERNAL COMBUSTION ENGINES

**Kenji Goto, Shizuoka, Japan, assignor to Toyota Jidosha Kogyo Kabushiki Kaisha, Aichi, Japan**

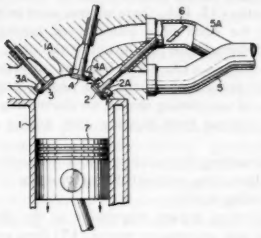
**Filed Oct. 3, 1973, Ser. No. 403,158**

**Claims priority, application Japan, July 9, 1973, 48-77251**

**Int. Cl.² F01L** *1/34*

**U.S. Cl. 123—75 E** **5 Claims**

**1.** A method of controlling the output of a four-cycle internal combustion engine, comprising supplying an amount of mixture corresponding to the amount required at the full-load operation of the engine into a cylinder of the engine at the suction stroke, and at the compression stroke causing an amount of mixture in excess to the amount required for operation of the engine to flow back from the cylinder into a suction pipe by the action of the piston in said cylinder, said mixture in excess being delivered only to the suction pipe coupled to the corresponding cylinder and being substantially confined



for use within said corresponding cylinder, whereby the output of the engine is controlled.

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**3,919,987**

## METHOD AND APPARATUS FOR AUTOMATIC SHIFT OF IGNITION TIMING

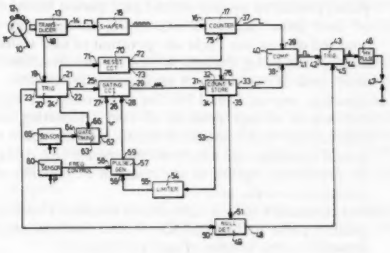
**Georg Haubner, Berg; Jurgen Wesemeyer, Nurnberg-Reichelsdorf, and Werner Meier, Schwabach, all of Germany, assignors to Robert Bosch GmbH, Stuttgart, Germany**

**Filed Sept. 13, 1974, Ser. No. 505,800**

**Claims priority, application Germany, Sept. 23, 1973, 2352941**

**Int. Cl.² F02P** *5/04*

**U.S. Cl. 123—117 R** **17 Claims**



**1.** Method of timing ignition pulses of an internal combustion engine over a range of timing adjustment by means of a disk coupled to a drive shaft of said engine and bearing a sequence of electrically detectable timing marks thereon, comprising the steps of:

generating an alternating current and a concurrent direct current in a transducer (**13, 115**) in response to and during nearby passage of said timing marks (**12, 111**);

producing and transmitting to a count storage device (**32, 151***a*), while said direct current is being generated, a number of pulses dependent on at least one operating condition of said engine;

counting up the half waves of a single polarity of said alternating current produced on the next following passage of said timing marks by said transducer in a counter (**17,** 131) and comparing in a comparison state (**40, 170**) the count thereof with the number stored in said count storage device; and

producing an ignition pulse when the count in said counter (**17, 131**) equals the number stored in said count storage device (**33, 151***a*).

**3.** Apparatus for timing ignition pulses of an internal combustion engine over a range of timing adjustment, comprising: an internal combustion engine having an electrical ignition

system and having at least one driven shaft coupled to its crankshaft;

rotary disk means coupled to a driven shaft of said engine and provided with a sequence of electrically detectable timing marks (**12, 111**) thereon, one such sequence being provided for each of a plurality of timing operations produced during one revolution of the disk;

transducer means (**13, 115**) located adjacent said disk means for generating, during the nearby passage of said sequence of said timing marks, an alternating current and a direct current both flowing only during said nearby passage;

means for counting the number of half waves of one polarity of said alternating current during passage of a sequence of said timing marks;

trigger generating means responsive to the direct current output of said transducer means (**13**) for a triggered gate signal having a duration dependent on the of continuous flow of said direct current;

means for producing a sequence of pulses controlled in number in accordance with at least one engine operating condition and also in accordance with engine speed, said pulse sequence producing means including a source of a continuous sequence of pulses, first gate period timing means (**63, 136–137**) responsive to an engine operating condition, and second gate period timing means responsive to said triggered gate signal and to the output of said first gate period timing means, said second gate period timing means being arranged to provide output pulses in response to pulses of said source of pulses during a gate period established by said second gate period timing means;

counting and count storing means (**32, 151***a*) for counting and for storing the count of pulses in each sequence of pulses produced by said second gate period timing means of said pulse sequence producing means, the count counted during one cycle of operation of said transducer means (**13**) being thereby stored for the duration of the next cycle of operation of said transducer means;

comparison means (**40, 170**) for comparing the count of half waves of one polarity of said alternating current produced by said transducer means with the count stored in said counting and count storing means (**32, 151***a*) and for producing a pulse at the moment of equality of said compared counts, and

means responsive to said comparison means for initiating an ignition pulse in said ignition system for said engine in response to the output of said comparison.

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**3,919,988**

## INDUCTION SYSTEMS FOR INTERNAL COMBUSTION ENGINES

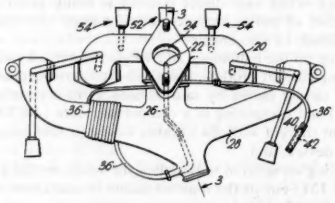
**Cheong Chee Bun, 3 Lorong Sultan, Kuala Lumpur, Malaysia**

**Filed Jan. 5, 1971, Ser. No. 104,028**

**Claims priority, application United Kingdom, Jan. 9, 1970, 1176/70; Jan. 9, 1970, 1177/70**

**Int. Cl.**[2] **F02B** *33/00*; **F02M** *31/00*

**U.S. Cl. 123—119 E** **20 Claims**




**1.** An induction system for an internal combustion engine, including a heat exchanger element situated in the path of hot exhaust gases leaving the engine, said heat exchanger element including an oxide forming element containing available copper, said heat exchanger element being operative to transfer hot exhaust gases heat to said oxide forming element, and said oxide forming element being in contact with a stream of oxidizing gas inducted into said induction system through said heat exchanger element, whereby the copper of said oxide forming element is raised to a temperature of at least 200° C. during operation of the engine in heated conditions between light loads and full load to produce a non-coherent copper oxide film on the surface of the oxide forming element and particles from this film are entrained by the gas stream.

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**3,919,989**

## FUEL INJECTION PUMPING APPARATUS

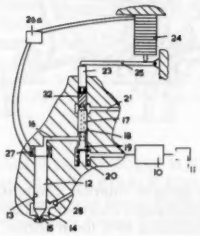
**Boaz Antony Jarrett, Sevenoaks, and Ivor Fenne, Greenford, both of England, assignors to C.A.V. Limited, Birmingham, England**

**Filed May 9, 1974, Ser. No. 468,509**

**Claims priority, application United Kingdom, May 12, 1973, 22717/73**

**Int. Cl.**[2] **F02D** *5/02*

**U.S. Cl. 123—139 R** **16 Claims**




**1.** A fuel injection pumping apparatus for supplying fuel to internal combustion engines and comprising an accumulator in which fuel is stored at high pressure, a cylinder, a displacement piston contained within said cylinder, an outlet communicating with one end of said cylinder, valve means for controlling flow of fuel from a low pressure source to said one end of the cylinder, a first valve positioned intermediate the accumulator and the other end of said cylinder and operable to allow fuel under pressure from the accumulator to act on one end of said displacement piston thereby to cause movement of said piston to displace fuel through said outlet, a second valve through which said other end of the cylinder can be connected to a drain, actuating means for actuating said first and second valves whereby said displacement piston is moved to said one end of the cylinder to displace fuel through the outlet by opening the first valve and closing the second valve, said piston being moved away from said one end of the cylinder by closing the first valve and opening the second valve, sensing means for sensing the extent of movement of the displacement piston away from said one end of the cylinder, and control means responsive to the signal produced by said sensing means for operating said actuating means to reclose said second valve to halt the movement of the displacement piston away from said one end of the cylinder.

3,919,990

## FUEL INJECTION PUMP

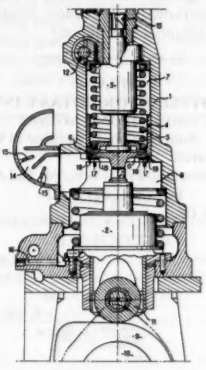
**Dirk Bastenhof, Eaubonne, France, assignor to Societe D'Etudes de Machines Thermiques, Saint Denis, France**

**Filed May 21, 1974, Ser. No. 471,905**

**Claims priority, application France, June 26, 1973, 73.23379**

**Int. Cl. F02m** *39/00*

**U.S. Cl. 123—139 AC** **4 Claims**



**1.** A fuel injection pump for an internal combustion engine, including a constant-stroke, reciprocating plunger piston driven according to a straight translatory motion by a tappet and rotated for adjustment by a gear consisting of an operating control toothed rack and a driven pinion coaxial with said plunger piston, and a pad interposed between said plunger piston and said tappet, which pad is slidably mounted within the pump casing while forming a cup-like seat, a return spring supported by said pad and biasing said plunger piston, said pad being formed with at least one thoroughfare hole providing communication between on the one hand a first mainly air space adjacent to said gear and defined above said pad towards said plunger piston and on the other hand a second space defined underneath said pad towards said tappet, wherein each thoroughfare hole is provided with an individual valve opening automatically during the upward motion of said pad through the force of inertia due to the acceleration of said pad and by the air compression within said first space and closing automatically during the downward motion of said pad for providing a vacuum through suction or drawing into said first space.

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3,919,991

## AUTOMATIC DECOMPRESSION DEVICE

**Rex Harding Neschke, El Segundo, and John Louis Zimmerer, Torrance, both of Calif., assignors to McCulloch Corporation, Los Angeles, Calif.**

**Filed Jan. 7, 1974, Ser. No. 431,311**

**Int. Cl.² F01L** *13/08*

**U.S. Cl. 123—182** **14 Claims**

**12.** An automatic decompression valve apparatus to facilitate starting of an internal combustion engine, said apparatus comprising:

housing means comprising:

inlet means for communicating with an interior of a cylinder of said internal combustion engine;

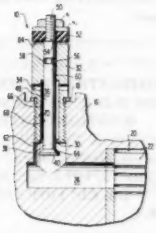
outlet means for communicating with a zone having relatively lower pressure than said interior of said cylinder during operation of said internal combustion engine;

transfer passage means for connecting said inlet means to said outlet means;

valving element means, having a pressure reaction face at an end of said valving element means nearest to the interior of said cylinder, said valve element means being movable between:

a valve-open position for intially opening said valve apparatus to vent compression pressure in said cylinder of said internal combustion engine during starting of said engine, and

a valve-closed position for blocking said inlet means in response to a predetermined ignition-induced increased pressure on said reaction face, corresponding to increased pressure in said interior of said cylinder, to maintain ordinary compression pressure in said cylinder during operation of said internal combustion engine; and



permanent magnetic biasing means continuously biasing said valving element means toward a valve-open mode for:

holding said valving element means in a valve open position when said engine is in a nonoperating condition; and

urging said valve element towards said valve open position when said reaction face is displaced in a direction away from said interior of said cylinder into a valve closed position during operating conditions of said engine;

the biasing action of said permanent magnet biasing means becoming progressively weaker as said valve element approaches its valve-closed mode; and

at least a portion of said magnetic biasing means being mounted on said valving element means to define valving element movement limiting means for limiting movement of said valving element means in a valve open direction.

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3,919,992

## FUEL INJECTION SYSTEM

**Konrad Eckert, Stuttgart, Germany, assignor to Robert Bosch GmbH, Stuttgart, Germany**

**Filed Sept. 12, 1974, Ser. No. 505,214**

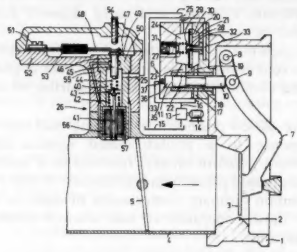
**Claims priority, application Germany, Sept. 28, 1973, 2348859**

**Int. Cl.² F02M** *69/00*

**U.S. Cl. 123—139 AW** **13 Claims**

**1.** In a fuel injection system for separately ignited, internal combustion engines involving continuous injection into an induction tube section of an intake manifold, a measuring member and a randomly activatable throttle valve being arranged in series in the induction tube section, the measuring member being displaceable against a restoring force by an operating member according to the amount of air flowing through, a mobile part of a metering valve which is disposed in a fuel line and which, with a constant pressure difference, meters out a quantity of fuel proportional to the amount of air being coupled to the operating member, the restoring force for the measuring member being produced by pressure fluid

which acts at least indirectly on the operating member, the improvement comprising means for adjusting fuel pressure



downstream from said metering valve for influencing pressure of the pressure fluid.

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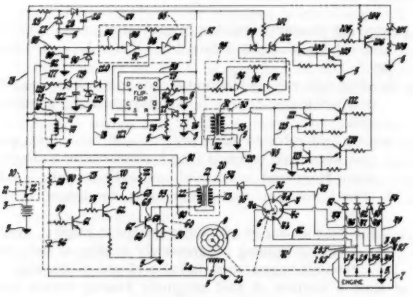
**3,919,993**

## INTERNAL COMBUSTION ENGINE COORDINATED DUAL ACTION INDUCTIVE DISCHARGE SPARK IGNITION SYSTEM

**John G. Neuman, Grosse Pte., Mich., assignor to General Motors Corporation, Detroit, Mich.**

**Filed July 10, 1974, Ser. No. 487,238**
**Int. Cl.[2] F02P** *3/02*
**U.S. Cl. 123—148 E** **13 Claims**



**1.** A dual action inductive discharge internal combustion engine ignition system for use with an engine having at least one combustion chamber and an ignition arc gap in communication therewith across which an ignition arc is struck to initiate combustion within the chamber and thereafter maintained efficiently at high arc energy comprising: a high voltage ignition coil having a magnetic core and primary and secondary windings, the turns ratio and core size being such as to produce in said secondary winding an arc-striking potential upon interruption of predetermined primary winding energizing current; a high current ignition coil having a magnetic core and primary and secondary windings, the turns ratio and core size being such as to produce in said secondary winding a potential incapable of striking an arc upon interruption of a predetermined primary current but capable of delivering high arc current after the arc is struck, a high voltage ignition coil primary winding energizing circuit through which energizing current flows through said primary winding of said high voltage ignition coil; a high current ignition coil primary winding energizing circuit through which energizing current flows through said primary winding of said high current ignition coil; means for completing said high voltage ignition coil primary winding energizing circuit and for abruptly interrupting the same in timed relationship with said engine at the instant when the arc is to be struck; circuit means responsive to voltage at the primary winding of the high voltage ignition coil effective to initiate current flow in the primary of the high current ignition coil when voltage changes in one sense as current flow through the primary winding of the high voltage ignition coil starts and to interrupt current flow in the primary winding of the high current ignition coil when voltage changes in opposite sense occur in the primary winding of the high voltage ignition coil upon creation of the arc; and means including at least one rectifier connecting said high voltage ignition coil secondary winding and said high current ignition coil secondary winding to the ignition arc gap so that the high voltage ignition coil and the high current ignition coil primary winding energizing currents, when interrupted in sequence, create and maintain the arc without substantial interaction.

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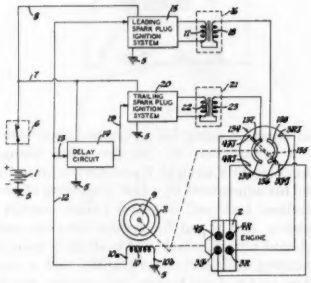
**3,919,994**

## IGNITION SYSTEM FOR ROTARY INTERNAL COMBUSTION ENGINES

**Curtis D. Munden, Anderson, Ind., assignor to General Motors Corporation, Detroit, Mich.**

**Filed Nov. 11, 1974, Ser. No. 522,616**
**Int. Cl.[2] F02P** *3/02*
**U.S. Cl. 123—148 DS** **5 Claims**




**1.** An ignition system for a rotary internal combustion engine having a leading and a trailing spark plug for each combustion chamber thereof comprising in combination with a source of direct current potential: means for producing a series of alternating current signals in timed relationship with an engine; a leading spark plug electronic ignition system including an ignition coil having primary and secondary windings and a trailing spark plug electronic ignition system including an ignition coil having primary and secondary windings, each of said electronic ignition systems having input circuit means and being of the type responsive to electrical signals of a selected polarity for completing and of another polarity for interrupting an energizing circuit across said source of direct current potential for the said primary winding of the corresponding said ignition coil; means for applying said series of alternating current signals to said input circuit means of said leading spark plug electronic ignition system; circuit means responsive to said series of alternating current signals for producing direct current potential synchronizing signals having leading and trailing edges corresponding to the negative to positive polarity zero crossover point and to the positive to negative polarity zero crossover point, respectively, of each cycle of said series of alternating current signals; circuit means responsive to said leading edge of said synchronizing signals for producing a range signal of a direct current potential level directly proportional to the frequency of said series of alter-

nating current signals; timing circuit means arranged to be electrically influenced by said range signal for producing a direct current potential ramp timing signal which is initiated at the positive to negative polarity zero crossover point of each cycle of said series of alternating current signals and increases linearly in potential level at a rate determined by the potential level of said range signal; means for producing a delay signal of a selectable direct current potential level; circuit means responsive to said timing signal and said delay signal for producing a trailing spark plug ignition signal when said timing signal increases to a direct current potential level equal to that of said delay signal; logic circuit means responsive to said leading edge of each of said synchronizing signals and to said trailing spark plug ignition signal for producing a trailing spark plug ignition system dwell signal of a selected polarity and of a pulse width equal to the period between said leading edge of said synchronizing signals and said trailing spark plug ignition signal; and means for applying said trailing spark plug ignition system dwell signal to said input circuit means of said trailing spark plug electronic ignition system.

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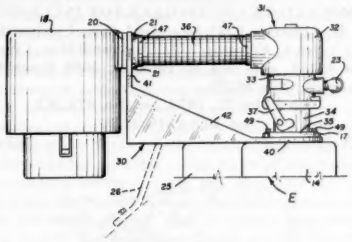
**3,919,995**
**CONVERSION BRACKET FOR GAS ENGINE CARBURETOR**
**William L. Todd, 100 Cottonwood Lane, Gillette, Wyo. 82716**
**Filed Dec. 13, 1974, Ser. No. 532,624**
**Int. Cl.[2] F02F** *7/00*
**U.S. Cl. 123—195 A** **4 Claims**



**1.** A natural gas engine including a downwardly directed intake path at a port surface at the top of the engine body and a carburetion system, which comprises, in combination therewith:

a. an upstanding downdraft carburetor having a side intake mounted over the engine intake port;

b. an air cleaner having a side outlet;

c. a horizontally disposed intake line connecting the air cleaner side outlet with the carburetor side intake, with the air cleaner outlet and carburetor intake being substantially at the same elevation; and

d. a rigid support bracket having a first portion secured to the engine body and second portion upstanding from the first portion, and reaching to and connecting with the air cleaner to support the same, and wherein said second portion is a flat, plate-like wall member having an orifice in registration with the air cleaner outlet, and proportioned to permit the intake line to extend thereinto for connection with the air cleaner outlet.

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**3,919,996**
**REPEATING SELF PROJECTING BAND TYPE APPARATUS**
**Edgar O. McAlister, 9810 E. Broadway, Tucson, Ariz. 85710**
**Filed May 22, 1974, Ser. No. 472,129**
**Int. Cl.[2] F41B** *7/02*
**U.S. Cl. 124—19** **11 Claims**

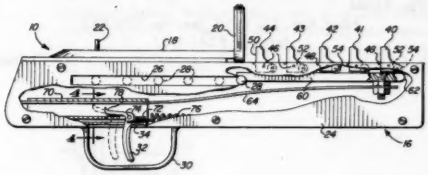
**1.** Rubber gun apparatus for shooting a plurality of elastic members, comprising, in combination:

a stock for holding the apparatus;

barrel means secured to the stock for holding a portion of each of the plurality of elastic members;

receiver means secured to the stock and to the barrel means for controlling the shooting of the elastic members from the rubber gun apparatus, including

pivotable stud means for holding another portion of each of the plurality of the elastic members in tension condition, said stud means comprising a plurality of studs positioned



generally along the longitudinal axis of the barrel means, movable means adjacent the stud means for controlling the movement of each of the stud means to sequentially release an elastic member, said movable means being unbiased and slidably mounted, and

trigger means for controlling the movement of the movable means and movable to engage the movable means and to cause the movable means to move rearwardly to disengage successive studs and thereby permit pivoting of said studs.

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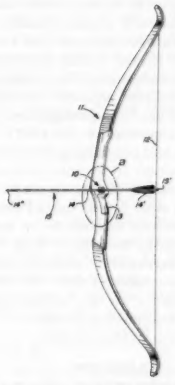
**3,919,997**
**SNAP-IN ARROW REST**
**Fredrick M. Day, 2327 W. Avalon Drive, Phoenix, Ariz. 85015**
**Filed Aug. 23, 1974, Ser. No. 500,098**
**Int. Cl.[2] F41B** *5/00*
**U.S. Cl. 124—41 A** **4 Claims**



**1.** An arrow-rest for mounting on an archery bow to yieldingly support the arrow shaft while drawing the bowstring taut and providing for quick escape of the arrow from the arrow-rest when the taut bowstring is released comprising:

a mounting plate,

means mounted on said plate for releasably gripping the shaft of an arrow,

said means comprising a hairpin configuration having a pair of juxtapositioned cylindrical wire control arms interconnected by a bight portion and biased toward each other to jointly hold the shaft of an arrow therebetween,

said bight portion being attached to said mounting plate with said control arms extending laterally therefrom and angularly of said mounting plate,

said control arms extending from said mounting plate longitudinally the length thereof and also generally in the direction of an inplace arrow on a bow and each arm movable independently of the other to flex toward and away from a shaft of an inplace arrow.

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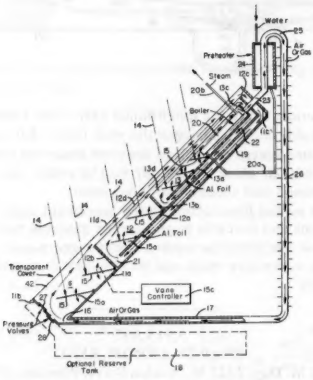
**3,919,998**

## CONVECTION-TYPE SOLAR HEATING UNIT

**Louis W. Parker, 2408 Sunrise Key Blvd., Fort Lauderdale, Fla. 33304**

**Filed Apr. 23, 1975, Ser. No. 570,883**
**Int. Cl.² F24J** *3/02*
**U.S. Cl. 126—270** **17 Claims**




**1.** A solar heater comprising a plurality of elongated containers nested one within the other, each of said containers having a transparent upper surface, the transparent upper surfaces of said containers being superposed and positioned to admit solar radiation to each of said containers, each of said containers including an inlet adjacent one end thereof for a gaseous medium to be heated within said container by solar radiation, each of said containers also including an outlet for the heated gaseous medium adjacent its other end, means defining a plurality of gas flow passageways connecting the outlet of each of said containers to the inlet of the next inner one of said containers and connecting the outlet of the innermost one of said containers to the inlet of the outermost one of said containers whereby said gaseous medium flows continuously to and through each of said nested containers successively to cause said gaseous medium to be heated to successively higher temperatures as it flows from one end to the other of each of said successively inwardly disposed containers, and heat utilization means within the innermost one of said containers responsive to the heated gaseous medium flowing through said innermost container.

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**3,919,999**

## BABY TRANSPORTING APPARATUS

**Louis Gluck, La Jolla, and William Keith Ross Watson, San Diego, both of Calif., assignors to Kay Laboratories, Inc., San Diego, Calif.**

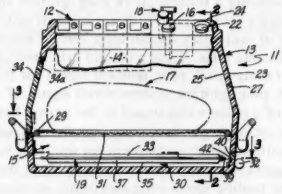
**Filed July 5, 1973, Ser. No. 376,792**
**Int. Cl.² A61G** *11/00*
**U.S. Cl. 128—1 B** **23 Claims**

**1.** A portable and self-sufficient transporter for maintaining a baby at a substantially constant temperature for an extended period of time, including:

means defining an enclosure having a plurality of walls;

means disposed in one wall of the enclosure means and defining a door movable between a first position for closing the enclosure means and a second position for opening the enclosure means to provide for an admittance of the baby into the enclosure means and a removal of the baby from the enclosure means;

a second wall of the enclosure means being shaped to provide for a reflection of heat from the second wall into the enclosure means to heat the baby within the enclosure means even upon the disposition of the door in the second position;



a platform supported in the enclosure;

a cartridge supported in the enclosure at a position near the bottom of the enclosure and

chemical means disposed within the cartridge for generating heat at the substantially constant temperature and for directing heat to the second wall to be reflected by the second wall.

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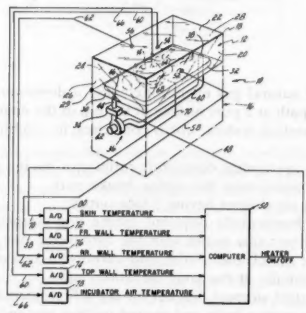
**3,920,000**

## TEMPERATURE CONTROLLER FOR INCUBATORS

**Harry D. Atherton, 6247 Graceland Ave., Cincinnati, Ohio 45237; Neil K. Edwards, 7711 Shadowhill Way, Cincinnati, Ohio 45242, and Paul H. Perlstein, 4088 Rosehill Ave., Cincinnati, Ohio 45229**

**Filed May 22, 1974, Ser. No. 472,362**
**Int. Cl.² A61G** *11/00*
**U.S. Cl. 128—1 B** **22 Claims**




**17.** A control system for use in combination with an incubator adapted to receive an infant therein including a heater for supplying warm air to said incubator, to control said air heater comprising:

an incubator having top, bottom and side walls and a heater therein

a plurality of temperature sensor means disposed on said walls of said incubator to produce signals indicative of wall temperature, said walls affecting, through heat radiation, the body temperature of the infant,

a temperature sensor means adapted to be placed on the skin of the infant in the incubator to produce signals indicative of skin temperature,

a temperature sensor means disposed inside the incubator to produce signals indicative of air temperature inside the incubator,

means operatively associated with said sensor means and responsive to said wall temperature signals and said air temperature signals to produce signals indicative of an environment temperature and responsive to said skin temperature signals and said environment temperature signals to produce signals indicative of a control temperature, and

means responsive to said control temperature signals to turn off said heater when said control temperature exceeds an upper control temperature limit.

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**3,920,001**

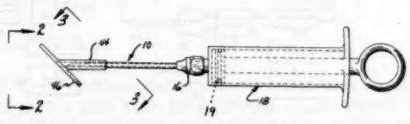
## ASPIRATOR DEVICE

**Donald W. Edwards, 821 Peoria Ave., Dixon, Ill. 61021**

**Continuation-in-part of Ser. No. 58,049, July 24, 1970, abandoned. This application June 10, 1974, Ser. No. 477,847**

**Int. Cl.[2] A61B** *5/14*

**U.S. Cl. 128—2 F** **3 Claims**



**1.** An aspirator device for taking a blood sample and which alleviates the necessity of accurate positioning, the device including: means defining a reservoir for receiving blood from a patient; means for applying a partial vacuum on the reservoir to draw blood from the patient; a cannula having a size in the range of 25 guage to 16 guage; the cannula having a penetrating point at its distal end and a hub at its proximal end operatively connected to the reservoir; the cannula having an opening at its distal end communicating with its lumen, and an axially elongate lateral opening through the cannula wall on the side opposite the penetrating point; the lateral opening intersecting the end opening and extending along the cannula to a remote end a distance from the distal end in the range of 10 to 40 times the diameter of the lumen of the cannula; the lateral opening having a width less than 180°;the cannula having a smooth exterior surface of uniform diameter extending the full length thereof, with no obstructions thereon; a slidable sealing sleeve having a length greater than the distance from the distal end to the remote end of the lateral opening; the cannula having a length greater than twice the length of the sleeve; the cannula slidably extending through the sleeve from a first position where the penetrating point is inside the sleeve and the lateral opening is covered by the sleeve, to a position contiguous to the hub; the sleeve closely surrounding the cannula and arranged to provide an air-tight seal against the cannula at said first position to provide an air-tight cover extending over the lateral opening both prior to and during insertion of the cannula into the patient; means at the end of the sleeve adjacent the penetrating point for sealing against the skin of the patient; the last-mentioned means including an outwardly-extending base at an oblique angle to the axis of the sleeve and providing a flat, skin-engaging surface; the base being formed from a transparent synthetic resin and extending outwardly from the cannula about ⅜ inch in each direction.

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**3,920,002**

## FLUID SAMPLING AND MEASURING APPARATUS

**John F. Dye; William J. Binard, both of Barrington, and Bhupendra C. Patel, Elgin, all of Ill., assignors to The Kendall Company, Walpole, Mass.**

**Division of Ser. No. 210,888, Dec. 22, 1971, abandoned. This application June 28, 1974, Ser. No. 484,158**

**Int. Cl.[2] A61B** *5/00*

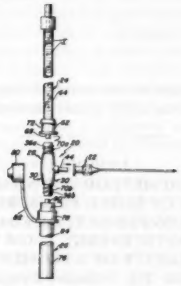
**U.S. Cl. 128—2 R** **7 Claims**

**1.** Apparatus for sampling and measuring the pressure of body fluid, comprising in combination:

a connecting valve including,

a housing having an elongated chamber, a pair of nipples extending from opposite ends of the housing, with each of said nipples having a passageway communicating between the chamber and the outside of the housing, a seat adjacent the inner end of each nipple relative the chamber, and a stem extending outwardly from the housing intermediate the seats and having a channel communicating between the chamber and the outside of the housing, and

double-ended plug means longitudinally biased in the chamber against both of said seats in sealing engagement to prevent escape of fluid through said passageways, each end of the plug means individually retracting into the chamber away from the associated seat



responsive to force applied to each end of the plug means to permit passage of fluid between the stem channel and associated nipple passageway;

a hollow needle removably connected to the housing stem and communicating with the stem channel for passage of fluid through the needle and stem into the chamber;

a manometer having a hollow stem receivable in at least one of said nipple passageways and being of sufficient length to contact the associated end of the plug means; and

means for removably connecting the manometer to the associated nipple with the manometer stem extending a sufficient distance into the one passageway to retract said associated end of the plug means from the associated seat and permit passage of fluid from said chamber to the manometer.

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**3,920,003**

## DETECTING SMALL POTENTIAL DIFFERENCES IN A MAMMALIAN BODY

**Arthur Edward Michael Ash, Congdons Bridge, Cornwall, and Jesse William Thomas Roope, 11 Park Ave. Potters Bar, Hertfordshire, both of England**

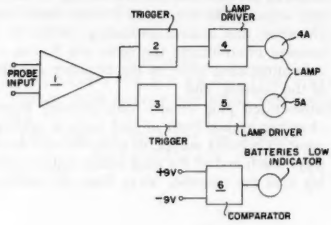
**Continuation-in-part of Ser. No. 318,083, Dec. 26, 1972, abandoned. This application June 27, 1974, Ser. No. 483,556**

**Int. Cl.[2] A61B** *5/05*

**U.S. Cl. 128—2.1 Z** **5 Claims**

**1.** A system for detecting small direct current electrical potential differences between the vagina of a mammal and another location of the body of said mammal spaced from the vaginal region, comprising an electrical circuit means for detecting, amplifying and identifying the polarity of said potential difference, said circuit means having two input terminals across which said small potential difference may be applied, an elongated vaginal probe adapted to be inserted in the vagina, said probe comprising an electrically conductive section at its terminal end, an adjacent section of insulating material at the other end, and electrically conductive means passing through said insulation section and forming an electrical connection between said conductive section and one of said terminals, a thin removable sheath of electrically conductive

rubber material disposed over the electrically conductive section of said probe, and means forming an electrical connection between the other location on said body spaced from the vaginal region and the other of said input terminals.

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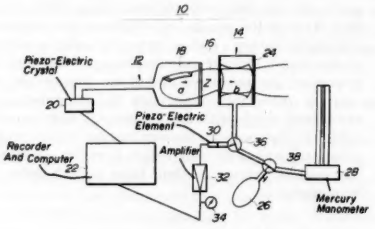
**3,920,004**

**DEVICE AND METHOD FOR NONINVASIVE MEASUREMENT OF BLOOD PRESSURE, RESISTANCE INERTANCE, COMPLIANCE, IMPEDANCE, BLOOD FLOW RATE, KINETIC ENERGY, FLOW VELOCITY AND PULSE VELOCITY OF A SEGMENT IN MAN**

**Ryu Nakayama, No. 2-2, 2-chome, Jiyugaoka, Meguro-ku, Tokyo, Japan**

**Filed Apr. 3, 1974, Ser. No. 457,508**
**Claims priority, application Japan, July 30, 1973, 48-85745**
**Int. Cl.[2] A61B 5/02**
**U.S. Cl. 128—2.05 A** **8 Claims**




1. A device for the noninvasive measurement of blood pressure, compliance, resistance, inertance, impedance, blood flow rate, blood flow velocity, blood flow kinetic energy and pulse wave velocity parameters within a specific part of a human being comprising:

volume measuring means adapted to be secured to said specific part of said human being for measuring changes in the blood flow volume within said specific part of said human being and for generating a first set of signals in response to said changes in said blood flow volume;

pressure measuring means adapted to be secured to said specific part of said human being and separated from said volume measuring means a predetermined distance for measuring changes in pressure within said specific part of said human being and for generating a second set of signals in response to said changes in said pressure;

means for simultaneously recording said first and second set of generated signals as functions of time; and

means for determining blood pressure, compliance, resistance, inertance, impedance, blood flow rate, flood flow velocity, blood flow kinetic energy and pulse wave velocity from said recorded first and second set of generated signals.

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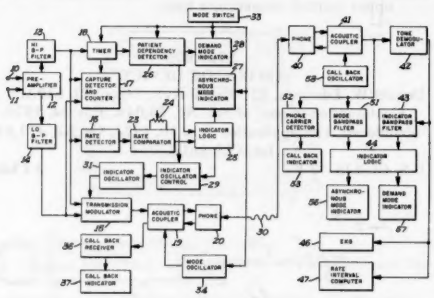
**3,920,005**

**EVALUATION SYSTEM FOR CARDIAC STIMULATORS**

**Peter P. Gombrich, Minnetonka, Minn., and John T. Gallagher, Seattle, Wash., assignors to Medtronic, Inc., Minneapolis, Minn.**

**Continuation of Ser. No. 235,252, March 16, 1972, abandoned. This application Sept. 28, 1973, Ser. No. 401,648**
**Int. Cl.[2] A61B 5/04**
**U.S. Cl. 128—2.06 R** **23 Claims**




1. A system for cardiac stimulator evaluation, the system adapted to be connected to means for sensing stimulation pulses and cardiac pulses, comprising: input means for receiving said sensed pulses; first means for differentiating between stimulation pulses and cardiac pulses and including high bandpass filter means and low bandpass filter means each connected to the input means, the high bandpass filter means including means for passing frequencies in the range of stimulation pulses and the low bandpass filter means including means for passing frequencies in the range of cardiac pulses; second means for detecting the rate of the stimulation pulses; third means for detecting heart captures due to stimulation pulses; means connecting the input means to the first means; means connecting the first means to the second and third means; and fourth means connected to the second and third means and responsive to signals therefrom for indicating the status of operation of the stimulator being evaluated.

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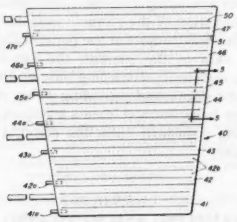
**3,920,006**

**INFLATABLE DEVICE FOR HEALING OF TISSUE**

**Roy Lapidus, Newton, Mass., assignor to Roy Lapidus, Inc., Needham, Mass.**

**Filed Jan. 2, 1974, Ser. No. 429,599**
**Int. Cl.[2] A61H 29/00**
**U.S. Cl. 128—24.1** **4 Claims**



1. A therapeutic device comprising an inflatable and deflatable, flexible tubular member shaped to fit over and be held on a body surface and having perforations on the surface of the member facing the body surface, and means for holding said member in position on said body surface; said tubular member comprising a plurality of independent, separately inflatable sections, each having an opening connecting to a pulsing supply of compressed air; said device being characterized in that deflation occurs solely by the passage of air

through said perforations; said separate inflatable sections, perforations and air supply proving a massaging action on said body surface.

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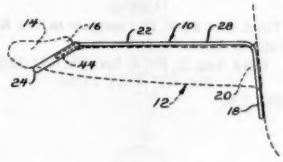
**3,920,007**
**SEXUAL AID**
**Roy M. Line, R.R. 4 Box 448, Kankakee, Ill. 60901**
**Filed Dec. 23, 1974, Ser. No. 535,191**
**Int. Cl.[2] A61F** *5/00*
**U.S. Cl. 128—79** **9 Claims**




1. A sexual aid adapted for use by a human male having a penis and a glans penis for promoting sexual relations by supporting the penis comprising: a ring-like base, said ring-like base being adapted to receive a root of the penis telecopically, said ring-like base having a slightly larger diameter than said root of said penis; a rigid support column having a pair of opposed ends, one end being formed integral with and substantially perpendicular to said ring-like base; and a collar connected to the other end of said rigid support column, said collar being positioned at an angle greater than 90° to said rigid support column, said collar being adapted for supportive engagement with the glans of said penis.

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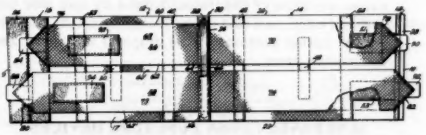
**3,920,008**
**SUPPORT BELT**
**Ira S. Lehman, 1830 N.E. 197 Terrace, Miami, Fla. 33162**
**Filed Aug. 8, 1974, Ser. No. 495,649**
**Int. Cl.[2] A61F** *5/24*
**U.S. Cl. 128—96** **8 Claims**



1. A sized belt to fit about the waist of a wearer between the hip box and rib cage comprising:
an elongate elastic primary band having an inside surface and an outside surface and opposed longitudinal edges and a first end zone and a second end zone and an intermediate zone between the end zones,
mutually interengaging means on the outside surface of the first end zone and the inside surface of the second end zone to intercooperate with one another to hold the band end zones in overlapping relation when the primary band is about the girth of a wearer with said second end zone overlapping said first end zone,
the normal longitudinal length of the primary band being less than the girth of a wearer and, when on a wearer and the end zones are in overlapping relation, being elastically stretched,
said intermediate zone having a central zone adapted to overlay the back of a wearer between the hip box and rib cage levels,
elastic secondary band means secured to the central zone of the primary band comprising:
a first band portion and a second band portion, each portion being a strip and having an inside surface and an outside surface and a proximal end and a distal end and opposed longitudinal edges,
said portions extending in opposite directions from said central zone and generally parallel to the center line of the primary band and being of a dimension between their respective longitudinal edges which is less than the distance between the opposed longitudinal edges of said primary band,
each of said secondary band portions having a distal end zone and
mutually interengaging means on the outside surface of the second end zone of said primary band and the inside surface of the distal end zone of said first band portion to intercooperate with one another to hold the distal end of the first band portion in overlapping relation of the first and second end zones of the primary band when the primary band is about the girth of a wearer with the first and second end zones in overlapping relation; and
mutually intercooperating means on the outside surface of the first band portion and on the inside surface of the distal end zone of the second band portion to intercooperate with one another to hold the distal end of the second band portion in overlapping relation of said end zones of said primary band and the distal end zone of said first band portion,
the length of said first band portion when overlaying said first primary band and extending toward said first end zone being of a normal length from the proximal end attachment to the central zone which is less than the distance from the proximal end attachment to the second end zone when said primary band end zones are in overlapping relation and the belt is about the girth of a wearer, the length of said second band portion when overlaying said primary band and extending toward said second end zone being of a normal length from the proximal end attachment to the central zone which is less than the distance from the proximal end attachment to the first end zone, when said primary band end zones and the distal end of the first band portion are in overlapped relation and the belt is about the girth of a wearer.

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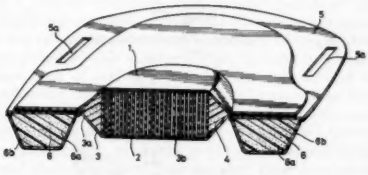
**3,920,009**
**TRACHEOSTOMATIC BANDAGE**
**Jarle Asbjörn Olsen, Syrengatan 4, S-234 00 Lomma, Sweden**
**Filed June 3, 1974, Ser. No. 475,849**
**Claims priority, application Sweden, June 5, 1973, 7307882**
**Int. Cl.[2] A61M** *15/00*
**U.S. Cl. 128—140 R** **15 Claims**



1. A bandage for laryngotomy patients who have a tracheostoma, having an air inlet portion comprising:
a. an outer fibrous layer,
b. an intermediate portion adjacent to said outer fibrous layer,
c. said intermediate portion comprising a material having heat and moisture exchanging properties whereby heat and moisture are transferred from exhaled air to inhaled air passing therethrough,
d. said intermediate portion having a large surface in contact with the air.

e. said intermediate portion engaging an inner layer,
f. said inner layer comprising means for sealing said bandage in engagement with the patient's throat around the stoma so that all breathing air is caused to flow through said bandage, and
g. said inner layer comprising separating means for preventing the sucking in of any portion of the bandage by the patient.

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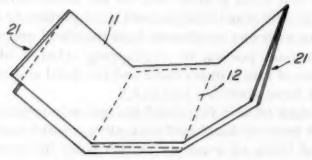
**3,920,010**
**CONTROLLED PRESSURE SURGICAL DRESSING AND METHOD OF MAKING SAME**
**Sheldon R. Chesky, Algonquin, Ill., assignor to The Kendall Company, Boston, Mass.**
**Filed Aug. 8, 1974, Ser. No. 495,673**
**Int. Cl.[2] A61L** *15/00*
**U.S. Cl. 128—156** **23 Claims**




1. A lofty, porous, soft surgical dressing capable of supplying a controlled pressure to a wound comprising:
a portion of washed gauze material having a plurality of superimposed plies therein; and,
a batt of three-dimensionally deregistered permanently crimped tow positioned substantially in the middle of said washed gauze material and being smaller than said washed gauze material, said deregistered crimped tow being completely covered by lengthwise folds of said gauze material.

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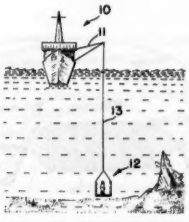
**3,920,011**
**SONIC DECOMPRESSION**
**Jon R. Losee, San Diego, Calif., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.**
**Filed June 24, 1974, Ser. No. 482,117**
**Int. Cl.[2] A61M** *16/02*
**U.S. Cl. 128—204** **7 Claims**




1. A diver decompression system comprising:
means to receive and support a diver in a highpressure, fluid-filled environment including;
a platform upon which the diver stands for establishing a decompression station;
means attached to said diver receiving means for lessening the high pressure over a predetermined period including;
a lifting cable means effectively secured to said platform at its distal end for raising the platform with the diver thereon to the surface,
hoisting means on the surface and attached to the bitter end of said lifting cable means for taking up said cable to thereby raise said platform and diver to the surface, and
means attached to said diver receiving means and positioned in close proximity thereto for ensonifying said decompression station with compressional wave energy directed towards said decompression station during the period of lessening the high pressure, whereby the length of time necessary to restore the diver to normal terrestrial pressure in good health is materially reduced.

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**3,920,012**
**INFANT HAND RESTRAINT DRAPE AND METHOD OF USING**
**Harish A. Patel, Oak Park, Ill., assignor to The Kendall Company, Walpole, Mass.**
**Filed Aug. 2, 1974, Ser. No. 494,250**
**Int. Cl.[2] A61F** *13/00*
**U.S. Cl. 128—134** **17 Claims**

1. An infant hand restraint drape, comprising:
a sheet of flexible material for placement of the infant thereon, said sheet having flap means on opposite sides of the placed infant and secured to the sheet after placement of the infant to receive the infant's arms and prevent movement thereof to the front of the infant's body, said drape including a pair of side edges and an end edge connecting the side edges, said flap means comprising corner portions of the drape defined by said side edges and end edge, and said drape including means for securing the corner portions of the drape to said sheet about the infant's arms.

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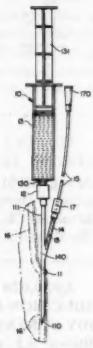
**3,920,013**
**SUBCLAVIAN VENA PUNCTURE DEVICES**
**Jason H. Bodzin, 14621 Balfour, Oak Park, Mich. 48237**
**Filed Jan. 6, 1975, Ser. No. 539,014**
**Int. Cl.[2] A61M** *5/00, 25/00*
**U.S. Cl. 128—214.4** **1 Claim**

1. A subclavian vena puncture device comprising
a. a straight hollow needle having a beveled lower tip and a syringe removably connected to the upper end thereof,
b. an equal hollow catheter guide tube fixed to one side of the upper central portion of said needle extending angularly upwardly therefrom,
c. a catheter temporarily closed by a metal stylet therein telescoped downwardly neatly through the said catheter guide tube to a position having its lower end disposed just short of the lower end of said catheter guide tube thereby leaving the main portion of the straight hollow needle clear whereby to permit blood to be aspirated from the subclavian vein responsive to partial withdrawal of the piston of the syringe,
d. whereafter the temporarily closed catheter is pushed downwardly from the catheter guide tube into and through the lower portion of said needle and into the subclavian vein of the patient to a distance selected by the surgeon,

e. thereafter the stylet is removed from the catheter providing a free passageway therethrough, the free end of the catheter immediately capped, the syringe removed from the upper end of the needle, and the top of said needle removably capped;



f. and finally the straight hollow needle is gently removed from the patient's vein by sliding the said needle upwardly therefrom leaving the catheter in the vein through the upper end of which blood and/or medicants may be provided to the patient when and as required employing conventional intravenous (I-V) means.

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**3,920,014**

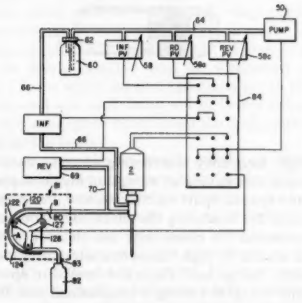
**SURGICAL SYSTEM FOR CONTROLLING THE INFUSION OF FLUID TO AND THE EVACUATION OF FLUID AND MATERIAL FROM AN OPERATING FIELD**

**Anton Banko, 1496 Mayflower Ave., Bronx, N.Y. 10461**

**Continuation-in-part of Ser. No. 208,282, Dec. 15, 1971, Pat. No. 3,812,855. This application June 3, 1974, Ser. No. 475,398**

**Int. Cl.[2] A61M** *1/00*

**U.S. Cl. 128—230** **29 Claims**




1. A system for use with a surgical instrument having an operative part at an operating site comprising:

means for supplying an infusion fluid under pressure to said operating site,

means for evacuating fluid with other material entrained therein from said operating site,

means for measuring the pressure of the infusion fluid,

means for measuring the pressure of the evacuated fluid and other material,

and means responsive to a predetermined measured pressure difference between the evacuated fluid and the infusion fluid for terminating the evacuation of fluid from the operating site.

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**3,920,015**

**DIAPER RESISTANT TO AMMONIA ODOR FORMATION**

**Joseph S. Wortham, Lake City, Fla., assignor to Allied Chemical Corporation, New York, N.Y.**

**Division of Ser. No. 288,469, Sept. 12, 1972, Pat. No. 3,843,701, and a continuation-in-part of Ser. No. 47,904, June 19, 1970, abandoned. This application Oct. 3, 1974, Ser. No. 511,890**

**Int. Cl.[2] A61F** *13/16;* **C07F** *5/06*

**U.S. Cl. 128—284** **37 Claims**

1. A diaper comprising a urine-absorbent material containing a member selected from the group consisting of a hydroxamic acid and a salt of the acid, in an amount sufficient to inhibit the decomposition of urea to ammonia when wetted by urine.

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**3,920,016**

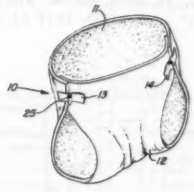
**FASTENING TAB MEANS FOR A DISPOSABLE DIAPER**

**Frederick K. Mesek, Downers Grove, and Ludwig Tritsch, Wilmette, both of Ill., assignors to Johnson & Johnson, New Brunswick, N.J.**

**Filed Sept. 3, 1974, Ser. No. 503,013**

**Int. Cl.[2] A61F** *13/16*

**U.S. Cl. 128—287** **10 Claims**



1. A disposable diaper of substantially quadrilateral configuration defined by longitudinal and transverse peripheral edges and having an inside surface for direction toward an infant when the diaper is worn by that infant and an outside surface for direction away from said infant, which disposable diaper comprises a thin flexible backing sheet of substantially moisture-impermeable material; a moisture-retaining layer including a pad of absorbent material superposed on said backing sheet and attached thereto; and a fastening tab means having a first tab portion attached to a portion of said backing sheet superposed by said moisture-retaining layer and near a longitudinal edge of said diaper, a doubled over second tab portion adjoining the first tab portion and attached to itself and forming a relatively small folded section outside the perimetric limits of the diaper, and a third tab portion adjoining the second tab segment, extending over to lie substantially flat against said diaper inside surface but free from attachment thereto, and having a pressure sensitive adhesive surface for attachment to the outside surface of the diaper when the diaper is applied to the infant.

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**3,920,017**

**CROTCH-SHAPED DIAPER AND METHOD**

**Hamzeh Karami, Crystal Lake, Ill., assignor to Colgate-Palmolive Company, New York, N.Y.**

**Filed Sept. 27, 1974, Ser. No. 509,978**

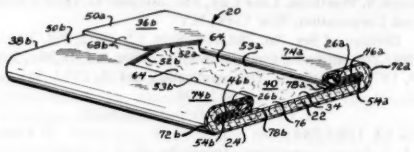
**Int. Cl.[2] A61F** *13/16;* **A41B** *13/02*

**U.S. Cl. 128—287** **25 Claims**

1. A disposable diaper, comprising:

an absorbent pad assembly having a pair of side edges, a front surface, and a back surface;

a fluid impervious backing sheet having a pair of side edges and a width greater than the width of said pad assembly, said backing sheet covering the back surface of the pad assembly and having lateral side margins extending past the side edges of the pad assembly, said side margins of the backing sheet being folded over and secured to the



front of the diaper with the side edges of the backing sheet being located in the proximity of the side edges of the pad assembly and with the folded over side margins defining side panels of the diaper, said side panels having recessed portions in the crotch region of the diaper for conformability of the diaper to the shape of the infant's legs, said side panels with said recessed portions each being folded over and secured to the front surface of the pad assembly in the crotch region of the diaper.

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**3,920,018**

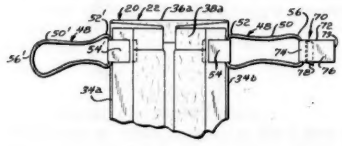
**DISPOSABLE DIAPER WITH ELASTIC MEANS**

**Charles H. Schaar, Lake Zurich, Ill., assignor to Colgate-Palmolive Company, New York, N.Y.**

**Filed Oct. 31, 1974, Ser. No. 519,495**

**Int. Cl.[2] A41B** *13/02*; **A61F** *13/16*

**U.S. Cl. 128—287** **23 Claims**



1. A disposable diaper, comprising:

an absorbent pad assembly having a front surface, a back surface, a pair of side edges, and a pair of waistline portions; and

elastic means connectable between a side edge position of one of said waistline portions and extending around the back surface of the other waistline portion to a second edge portion of said one waistline portion to provide a snug fit of the diaper about an infant.

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**3,920,019**

**DISPOSABLE DIAPER WITH COVER MEANS**

**Charles H. Schaar, Lake Zurich, Ill., assignor to Colgate-Palmolive Company, New York, N.Y.**

**Filed Dec. 12, 1974, Ser. No. 531,959**

**Int. Cl.[2] A61F** *13/16*

**U.S. Cl. 128—287** **29 Claims**

1. A disposable diaper, comprising:

an absorbent pad assembly having a fluid impervious backing sheet at least partially defining a back surface of the pad assembly, a front surface, a pair of side edges, a pair of end edges connecting the side edges, and a pair of waistline portions;

a disposal cover adjacent an edge of the pad assembly, said cover comprising a sheet of flexible material being transversely folded to a configuration of reduced dimensions, said sheet having a sufficient width and length to pass over remote portions of the pad assembly and provide a cover for the soiled pad assembly after use of the diaper; and

means for securing side regions of the folded sheet together and retaining the secured sheet to a surface of the pad assembly to provide access to a sufficient area of the sheet for covering the diaper.

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**3,920,020**

**INHIBITING PRODUCTION OF UNDESIRABLE PRODUCTS ON BODY SURFACES AND ENVIRONS**

**Kenneth S. Kraskin, Milltown, N.J., assignor to Personal Products Company, Milltown, N.J.**

**Filed June 12, 1974, Ser. No. 478,662**

**Int. Cl.[2] A61F** *13/16*

**U.S. Cl. 128—290** **3 Claims**

1. An absorbent catamenial dressing comprising an absorbent core and a liquid pervious cover around said core said dressing containing within the structure on at least the portions of the surface area thereof first to intercept menstrual fluids in use, an aminopolycarboxylic acid compound in an amount of at least about 0.001 gram per square inch.

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**3,920,021**

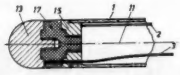
**COAGULATING DEVICES**

**Siegfried Hiltebrandt, August-Lammle-Strasse 16, 7134 Knittlingen, Germany**

**Filed May 15, 1974, Ser. No. 470,010**

**Int. Cl.[2] A61B** *17/40*; **A61N** *3/06*

**U.S. Cl. 128—303.17** **6 Claims**



1. A high frequency alternating electric current tissue-coagulating device having an elongated means supporting two separate and spaced apart electrodes, and electrical insulator spacer means for insulating the electrodes from each other, and circuit means for connecting the electrodes to opposite poles of a source of high frequency alternating current, the improvement being: said electrical insulator spacer means being axially elongated along a longitudinal axis thereof, the electrical insulator spacer means having a first step defined therein at a distal end thereof and having a second step defined therein at an interconnected and opposite proximal end thereof; the elongated means being further for positioning the electrodes at the distal end thereof, and said insulator spacer means being further for spacing the electrodes at said distal end of the elongated means; said electrodes including a first annular electrode mounted in juxtaposition to the second step onto said electrical insulator spacer means, and a second hemispherically shaped terminal-end electrode mounted on

said first step onto said electrical insulator spacer means, and said electrical insulator spacer means and said electrodes being mounted on said distal end of the elongated means at said proximal end of the electrical insulator spacer means, each of the first annular electrode and the second hemispherically shaped terminal-end electrode in a mounted state having predetermined amounts of exterior exposed surface area, respectively for each, whereby tissue in contact with both the first annular electrode and the second hemispherically shaped terminal-end electrode becomes coagulated when the high frequency alternating electric current is passed through the contacted tissue between the electrodes.

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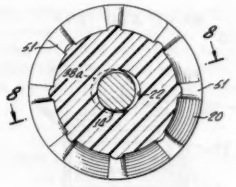
## 3,920,022
## SURGICAL INSTRUMENT

**Macey A. Pastor, 62222 Nita Ave., Woodland Hills, Calif. 91364**

**Filed Apr. 19, 1974, Ser. No. 462,383**
**Int. Cl.² A61B** *17/36*
**U.S. Cl. 128—303.13** **11 Claims**




1. A surgical instrument comprising a rear body portion adapted to be held in the hand of an operator,

a forward body portion mounted to said rear body portion for rotation about a first axis and adapted to be grasped and rotated by the fingers of the hand in which the rear body portion is held,

said body portions respectively having first and second tool receiving bores positioned at respective forward ends thereof and of substantially equal diameters, each said bore centered upon an axis displaced from said first axis, said bores being aligned with each other when said body portions are in a first release position of relative angular rotation about said first axis, and being relatively misaligned when said body portions are in a second gripping position of relative angular rotation, whereby a tool shank may be freely inserted into or withdrawn from said aligned bores when the body portions are in said release position and said tool shank will be firmly grasped by the relatively misaligned bores when the body portions are in said gripping postion,

said body portions being readily displaced between said gripping and release positions by a one-handed operation in which said forward body portion may be grasped between the operator's thumb and another finger and said rear body portion may be grasped between the operator's palm and other fingers of the same hand to accomplish movement of the body portions between said gripping and release positions, said forward body portion comprising an outer elongated tubular element having said first tool receiving bore formed in a front end thereof and having an enlarged inner bore extending from an inner end of said first tool receiving bore to the rearward end of said tubular element, said rear body portion comprising an inner tubular element having a front end portion rotatably received in a forward portion of said enlarged inner bore of said outer tubular element to provide at least part of the rotatable mounting of said body portions, said tool receiving bore of said rear body portion extending through said front end portion of said inner tubular element in end-to-end relation to the tool receiving bore of said outer tubular element,

said inner tubular element including an outer peripheral surface rotatably engaged with an inner surface of the inner bore of said first tubular element at a rear end thereof to provide a part of the rotatable mounting of the two body portions,

inner tubular element being axially inserted into said first tubular element and including means for restraining relative rotation of said tubular elements in any one of a plurality of positions of relative rotation.

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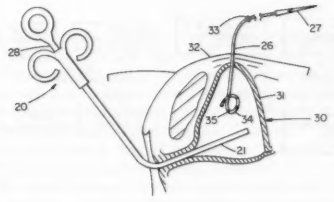
## 3,920,023
## METHOD AND APPARATUS FOR PLACEMENT OF A SUPRAPUBIC CATHETER

**John F. Dye, Reedsburg, Wis., and William J. Binard, Barrington, Ill., assignors to The Kendall Company, Boston, Mass.**

**Filed Mar. 21, 1974, Ser. No. 453,318**
**Int. Cl.² A61B** *17/34*
**U.S. Cl. 128—347** **16 Claims**




1. A method of placement for a suprapubic catheter comprising:

inserting the distal end of a rigid, hollow tubing member having an opening at both ends thereof through the urethra and into the bladder, said distal end being curved;

locating the opening on said distal end against the anterior wall of the bladder in the suprapubic region thereof;

pushing a cutting point through said tubing member and through said opening on said distal end so as to pierce the anterior wall of the bladder and abdomen in the suprapubic region and through the outer surface of the skin, said cutting point having a catheter attached thereto;

pulling said cutting point outwardly away from said tubing member leaving a portion of said catheter within the bladder; and

withdrawing said tubing member backwardly from said bladder leaving said catheter at the desired position within said bladder.

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## 3,920,024
## THRESHOLD TRACKING SYSTEM AND METHOD FOR STIMULATING A PHYSIOLOGICAL SYSTEM

**David L. Bowers, Bellevue, Wash., assignor to Vitatron Medical B.V., Dieren, Netherlands**

**Filed Apr. 16, 1973, Ser. No. 351,353**
**Int. Cl.² A61N** *1/36*
**U.S. Cl. 128—419 PG** **35 Claims**

1. A method of sensing and stimulating physiological activity of a body organ included as a portion of a physiological system, comprising:

a. sensing to determine the occurrence of said physiological activity;

b. generating stimulation pulses at a predetermined repetition rate and connecting one of said pulses to said body organ when absence of said physiological activity is sensed for a first predetermined interval defined by said repetition rate;

c. generating, following each such generated stimulation pulse, a predetermined series of backup pulses; and

d. connecting the pulses of said series serially to said body organ following failure of said physiological activity within a second predetermined time interval following connection of one of said stimulation pulses, until an occurrence of said physiological activity is sensed, and thereafter inhibiting connection of the remaining pulses of said series to said body organ.

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**3,920,025**

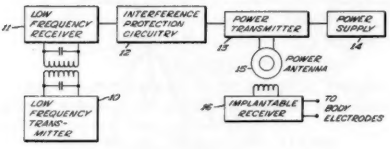
**ELECTRO-MEDICAL STIMULATOR SYSTEM**

**Peter Stasz, Minneapolis, and Harry G. Friedman, Plymouth, both of Minn., assignors to Medtronic, Inc., Minneapolis, Minn.**

**Filed July 15, 1974, Ser. No. 488,266**

**Int. Cl.[2] A61N** *1/36*

**U.S. Cl. 128—423** **7 Claims**




1. A body stimulation system comprising: first means adapted to be implanted in a body and including receiver means for receiving externally transmitted signals of radio frequency energy and means adapted to connect the receiver means to a portion of the body; second means adapted to be mounted external to the body for establishing an electromagnetic connection with said receiver means and including controlled radio frequency energy transmitter means for transmitting signals of radio frequency energy to the receiver means; third means for controlling the transmission of radio frequency energy from the second means, and including low frequency electromagnetic receiver means; fourth means including remote low frequency electromagnetic energy transmitter means for transmitting energy waves at a frequency in the range of approximately 2 kilohertz to 10 kilohertz, and including switch means connected to the low frequency transmitter means for controlling the operation thereof; and synchronizer means connected to the third means for turning the controlled radio frequency energy transmitter means on and off substantially coincident with a switching of the low frequency transmitter means between on and off states.

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**3,920,026**

**TOBACCO WITH FLAVOR ENHANCER**

**Albert H. Warfield, Durham; William Dwight Galloway, Chapel Hill, and Andrew G. Kallianos, Durham, all of N.C., assignors to Liggett & Myers Incorporated, Durham, N.C.**

**Filed Mar. 7, 1972, Ser. No. 232,526**

**Int. Cl.[2] A24B** *03/12, 15/04*

**U.S. Cl. 131—17 R** **14 Claims**

1. A tobacco composition comprising tobacco and a minor amount of a flavor enhancer wherein the enhancer is a nonvolatile solution of browning pigments made by heating between about 120° – 200°C a reaction mixture containing a solvent, valine and a carbonyl compound selected from the group consisting of a sugar, dihydroxy acetone and pyruvaldehyde.

**3,920,027**

**FLAVORED TOBACCO PRODUCT**

**Edouard P. Demole, Geneva, Switzerland, assignor to Firmenich S.A., Geneva, Switzerland**

**Division of Ser. No. 219,136, Jan. 19, 1972, Pat. No. 3,840,023. This application June 24, 1974, Ser. No. 482,776**

**Claims priority, application Switzerland, Jan. 19, 1971, 773/71; June 23, 1971, 9156/71; Jan. 11, 1972, 380/72**

**Int. Cl.[2] A24B** *3/12, 15/04*

**U.S. Cl. 131—17 R** **2 Claims**

1. A process for improving, enhancing or modifying the organoleptic properties of a tobacco product, which comprises adding thereto about 1 to about 1000 parts per million based on the weight of tobacco of 6-methyl-hepta-3,5-dien-2-one.

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**3,920,028**

**CONTAINER FOR ASHES AND EMBERS OF CIGARS AND CIGARETTES**

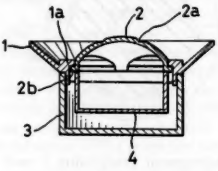
**Akira Kobayakawa, No. 43-14, Mutsukawa 3-Chome, Minami-Ku, Yokohama, Kanagawa, Japan**

**Filed Feb. 13, 1974, Ser. No. 442,178**

**Claims priority, application Japan, Nov. 28, 1973, 48-136160**

**Int. Cl.[2] A24F** *19/14*

**U.S. Cl. 131—236** **7 Claims**




1. A container for ashes and partially burned cigars and cigarettes comprising;

a container portion for holding a fire-extinguishing liquid therein;

an annular outer lid mounted on said container and having an open upper end, a flared portion at the outer marginal portion thereof extending outwardly and upwardly from said open end, said open upper end having a radially inner portion partially closing the same;

a cup-shaped floating member adapted to float in said fire extinguishing liquid; and

an inner lid mounted on said floating member and having a plurality of symmetrical cut-away portions at the outer peripheral portion thereof, through which ashes and partially burned cigar and cigarettes are dropped into said floating member, and defining a plurality of lugs between said cut-away portions, said lugs each projecting outward to contact at its upper face the lower face of said radially inner portion of said outer lid and at its lower face the upper rim of said floating member, whereby said floating member is prevented from escaping upward out of said container portion.

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**3,920,029**

**PAYOUT UNIT HAVING ANTIJACKPOTTING PROTECTION**

**Norman J. Burzen, Pacific, Mo., assignor to Nordon Industries, Inc., Fenton, Mo.**

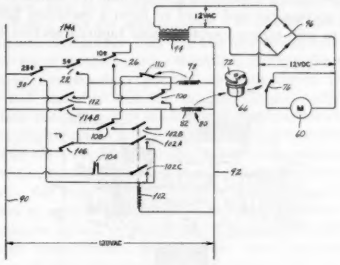
**Filed Sept. 25, 1974, Ser. No. 509,084**

**Int. Cl.[2] G07F** *11/24*

**U.S. Cl. 133—2** **14 Claims**

1. A payout apparatus for use in a coin handling machine to dispense coins from the machine, said apparatus comprising a wheel having at least one aperture therein sized to receive a coin; feed means for directing coins to the aperture in the wheel; retaining means for retaining a coin in the aperture

until the aperture reaches a predetermined position; an electric motor connected with the payout wheel for rotating the payout wheel, the motor having terminals; and timing means for connecting the motor to an electrical energy source to energize the motor, for disconnecting the motor from the



electrical energy source after the payout wheel has rotated a predetermined amount, and for further connecting the terminals of the motor such that a very low resistance is placed across it terminals after the motor has rotated said predetermined amount, whereby the motor is regeneratively braked.

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**3,920,030**

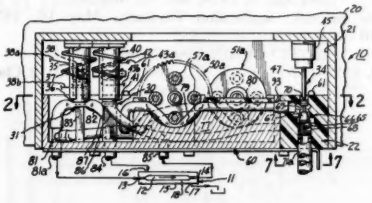
## DEVICE FOR CLEANING AND STERILIZING ARTIFICIAL KIDNEYS

**Barry D. Mason, Burbank, Calif., assignor to Ma-De Inc., Burbank, Calif.**

**Filed Oct. 18, 1974, Ser. No. 516,133**

**Int. Cl.[2] B08B** *9/00*

**U.S. Cl. 134—58 R** **28 Claims**



1. A device for treating artificial kidneys of the type which have a blood chamber with an inlet and an outlet, said device supplying liquid to flush, to clean, and to sterilize the blood chamber, and comprising: a base structure; an externally actuable blood chamber drain valve which includes flow conduitry and actuable valve means; externally actuable cleaning solution pump means and externally actuable sterilizing solution pump means, each including plenum means and actuating means; water conduit means; a manifold receiving water and also receiving cleaning solution and sterilizing when the respective pump is operated, said manifold discharging to an outlet for connection to the blood chamber inlet of an artificial kidney; conduit means for draining the outlet port of the blood chamber discharging to the blood chamber outlet valve; selectively actuable inlet valve means for controlling the supply of water, cleaning solution and sterilizing solution to the manifold; and control means effective selectively to operate said valve means and pump means so as to clean and sterilize an artificial kidney.

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**3,920,031**

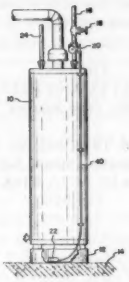
## SAFETY SHUTOFF DEVICE

**Don A. Maxfield, 1972 South, Eighth East, Salt Lake City, Utah 84105**

**Filed Apr. 18, 1969, Ser. No. 817,526**

**Int. Cl. F24k** *9/20*; **F16k** *31/00*

**U.S. Cl. 137—67** **12 Claims**



1. In combination, a water line for supplying water to a water storage tank; a valve in said water supply line having control means which allows water to flow through said valve and into said water storage tank when said control means is in an open position; said control means being biased to a closed position check means connected to said valve for maintaining said control means in said open position; a support housing positioned under said water storage tank; to be in communication with water leakage therefrom a plunger movably mounted in said housing; a material receptacle in said housing; a plug of material which changes its dimensions on being contacted with water positioned in said material receptacle for holding said plunger in a predetermined position; biasing means coacting with said plunger for urging said plunger against said plug of material in said material receptacle; and a connecting line coacting with a guide and connected at one end to said plunger and at its opposite end to said check means wherein a predetermined movement of said plunger in said housing moves said check means such that the control means moves to a closed position to restrict the flow of water through said valve.

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**3,920,032**

## FLUID RELEASE VALVE

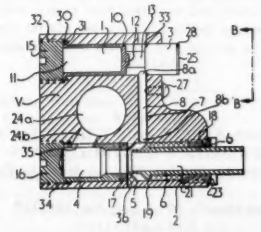
**Douglas James Major, Sutton Coldfield, England, assignor to Dunlop Limited, London, England**

**Filed Aug. 17, 1973, Ser. No. 389,208**

**Claims priority, application United Kingdom, Aug. 22, 1972, 39061/72**

**Int. Cl.[2] B60C** *17/00*; **B67B** *7/24*

**U.S. Cl. 137—68** **12 Claims**



1. A fluid release valve comprising a rupturable membrane which prevents release of fluid, a plunger spring-urged

towards a position in which it will cause rupture of the membrane, a plunger-retaining latch, and an ambient pressure responsive device arranged to move the latch from a plunger-retaining position to a plunger-releasing position when the ambient pressure falls below a predetermined value, said pressure responsive device comprising a piston acting on a closed chamber containing a gas or vapor, the pressure of the gas or vapor acting on one side of the piston and the ambient pressure on the other side whereby on fall of ambient pressure the piston moves to cause movement of the latch.

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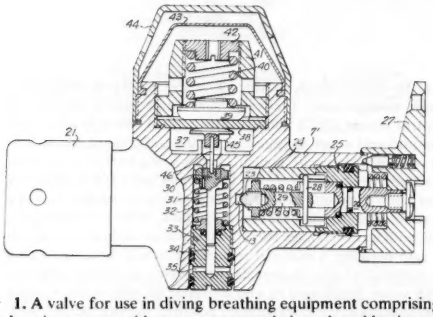
**3,920,033**

## DIVING VALVES AND REGULATORS

**Juan Vilarrubis Ferrando, calle Sagrera, 44 to 58, Barcelona, Spain**

**Filed July 5, 1973, Ser. No. 376,515**
**Claims priority, application Spain, July 5, 1972, 404538**
**Int. Cl.[2] B63C *11/22*; F16K *31/126***
**U.S. Cl. 137—81** **1 Claim**



**1.** A valve for use in diving breathing equipment comprising a housing connectable to a compressed air tank and having an air inlet passage with two branches and an air outlet, an automatic valving means in said housing normally closing one of said branches in response to the pressure of the surrounding water as against the pressure in said one of said branches, a manually operated valving means in said housing normally closing the other of said branches and a third valving means in said housing communicating with both said automatic and manual valving means and the air outlet of said housing and operable by the differential between the air pressure under control in said third valving means and the pressure of the surrounding water, said automatic valving means comprising a cylindrical housing being mounted in said first housing, a shut-off valve being slidably mounted in said cylindrical housing, a coil spring tending to retain said valve against said one of said branches closing the same, means for adjusting the pressure of said spring, said cylindrical housing having openings venting the spring side of said shut-off valve to ambient pressure, an elastic cap covering said cylindrical housing openings, a lubricating substance in said elastic cap and cylindrical housing and an outside cap having openings, mounted on said first housing and covering said elastic cap with said outside cap openings being open to said elastic cap whereby outside water can act on said shut-off valve tending to close the same.

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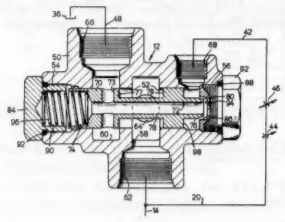
**3,920,034**

## PROPORTIONAL BYPASS VALVE HAVING VARIABLE AREA ORIFICE CONTROL MEANS

**James Otto Byers, Jr., Racine, Wis., assignor to Tomco, Inc., Racine, Wis.**

**Filed May 7, 1973, Ser. No. 358,037**
**Int. Cl.[2] G05D *11/00***
**U.S. Cl. 137—116** **2 Claims**

**1.** A proportional bypass valve comprising a housing having a bore, an inlet port, an outlet port and a pilot port connected to said bore, a valve spool slidably positioned in said bore to control fluid flow from said inlet port to said outlet port, said valve spool having a tapered section at one end of said spool to control the fluid flow rate from said pilot port to said outlet port, a passage through said spool connecting said pilot port to said outlet port, a plug at one end of said bore having a surface facing said bore, a recess in said surface of said plug, said recess having a diameter greater than the diameter of said tapered section on said spool to form a metering land with respect to said tapered section, said tapered section on said



spool being positioned for movement into said recess to control the fluid flow rate through the passage in said spool, a spring positioned to bias said spool to a closed position with respect to said inlet port and said outlet port, said spool being movable to an open position connecting said inlet port and said pilot port to said outlet port in response to an increase in fluid pressure in said pilot port, the amount of movement of said spool in said bore being proportional to the flow rate established between said recess in said plug and the tapered section of said spool.

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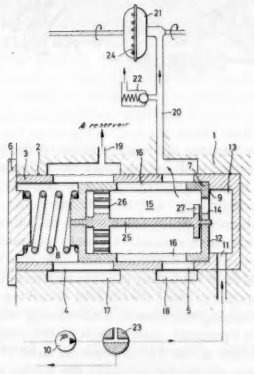
**3,920,035**

## FILLING VALVE FOR HYDRODYNAMIC TRANSMISSION ELEMENTS

**Reinhold Werner, Oberstedten, Germany, assignor to Klockner-Humboldt-Deutz AG, Cologne, Germany**

**Filed May 9, 1974, Ser. No. 468,565**
**Claims priority, application Germany, May 10, 1973, 2323550**
**Int. Cl.[2] G05D *11/00*; F16K *11/00***
**U.S. Cl. 137—117** **1 Claim**



**1.** A fill-up valve for hydrodynamic transmission elements, especially hydrodynamic couplings and torque converters, for controlling a speed dependent volume current of fluid dependent to flow being partially diverted under control thereby in conformity with the speed of said hydrodynamic transmission elements, which includes in combination, cylinder means

closed at both ends, hollow valve spool means reciprocable in said cylinder means, abutment means arranged in said cylinder means in spaced relationship to one end of said cylinder means for limiting movement of said valve spool means toward said one end of said cylinder means, preloaded spring means interposed between the other end of said cylinder means and the adjacent end of said valve spool means and continuously urging said valve spool means toward said abutment means, said first mentioned one end of said cylinder means defining with the adjacent end wall of said valve spool means a control chamber, and said last mentioned end wall of said valve spool means having a throttle bore therethrough for establishing necessarily regulated communication between said control chamber and the interior of said valve spool means, first conduit means leading into said control chamber for conveying thereinto actuating fluid for said hydrodynamic means, said valve spool means and said cylinder means having therebetween means forming a peripheral control slot means necessarily for regulation of variable communication with each other in conformity with the position of said valve spool means relative to said cylinder means, second and third conduit means respectively communicating with said peripheral slot means of said cylinder means for respectively conveying fluid to said hydrodynamic transmission means and to a reservoir, temperature responsive means adjacent to and for cooperation with said throttle bore for increasing the free cross section of said throttle bore in response to a decreasing temperature and for decreasing the free cross section of said throttle bore in response to an increasing temperature, said temperature responsive means including a rotary valve member and bimetal spring means associated with said rotary valve means for varying the position of the latter relative to said throttle bore to thereby vary the free cross section of said throttle bore.

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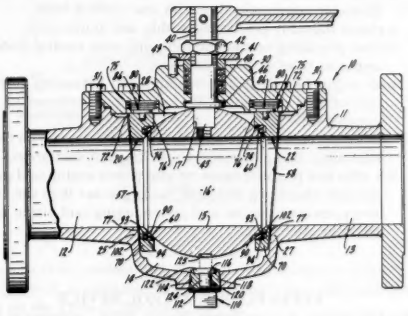
**3,920,036**
**BALL VALVE**

**Georg Karl Westenrieder, South Holland, Ill., assignor to Jacoby-Tarbox Corporation, Yonkers, N.Y.**

**Filed Dec. 10, 1973, Ser. No. 423,359**
**Int. Cl.[2] F16K** *43/00*
**U.S. Cl. 137—315** **3 Claims**



**1.** A ball valve comprising:

a. a body having two longitudinally aligned fluid passages and a lateral opening communicating with a central space;

b. a rotatable ball positioned within said central space and having an opening therethrough communicable with said fluid passages;

c. seat ring means positioned against and clampingly securing said ball therebetween;

d. bonnet means secured to said body in covering relationship to said seat ring means and said ball;

e. a rotatable valve stem, projecting through said lateral opening and said bonnet means, connected to said ball for rotating said ball between positions, permitting and preventing the passage of fluid therethrough;

f. said seat ring means including an outer retaining ring and an inner sealing ring received within a tapered annular recess in said outer retaining ring, said inner sealing ring having a sealing surface positioned to contact said ball and an outer portion of tapered cross section wedged into said tapered annular recess, said outer portion having an annular slot formed integrally therein to define a pair of leg portions which are compressed towards each other as said outer portion is wedged into said annular recess so as to force said inner sealing ring out of said annular recess into tighter contact against said ball; and

g. spring means disposed within said annular slot to provide a stiffer spring action to said leg portions.

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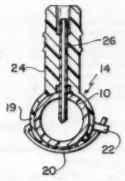
**3,920,037**
**DRIP IRRIGATION TAP AND SYSTEM**

**John K. Hoff; Richard H. Garrett; Michael J. Pastusek, all of Houston, and John B. Goss, Tomball, all of Tex., assignors to AG International, Houston, Tex.**

**Filed Apr. 29, 1974, Ser. No. 465,177**
**Int. Cl.[2] F16K** *5/00*
**U.S. Cl. 137—318** **4 Claims**




**3.** Apparatus for tapping a continuous flow of fluid from a pipe in an irrigation system, comprising,

a. a pipe constructed of penetrable material, and

b. a tap including,

i. a sleeve for surrounding a portion of the pipe (a),

ii. strap means for securing the sleeve (i) to the pipe (a),

iii. a male stinger integrally constructed of the sleeve (i) and of unitary construction therewith extending from the exterior of said sleeve, and

iv. a tubular cannula secured within the male stinger (iii) with one end extending through the sleeve (i) and having an axially hollow pointed tip at its extremity for penetrating the pipe (a) and providing fluid communication from the pipe (a) to the male stinger (iii).

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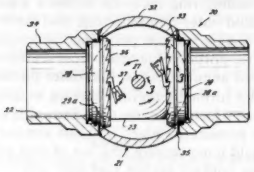
**3,920,038**
**BALL VALVE**

**Herbert Allen, Houston, Tex., assignor to Cameron Iron Works, Inc., Houston,, Tex.**

**Filed May 28, 1974, Ser. No. 473,562**
**Int. Cl.[2] F16K** *5/06, 25/04*
**U.S. Cl. 137—330** **4 Claims**

**1.** A ball valve, comprising a body having a flowway therethrough, a ball closure having a port therethrough and being rotatable within the body between positions opening and closing the flowway, a seat rotatable about its axis and mounted within the body for engaging the closure, said seat

having teeth about its periphery and a pawl mounted on the closure for engaging a tooth on the seat and pulling it from one



rotative position to another with a force which has a component acting toward the closure, upon rotation of the closure.

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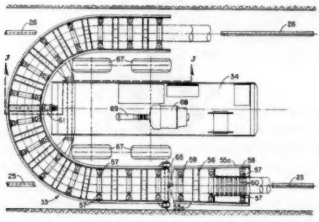
**3,920,039**

## MONORAIL SUPPORT APPARATUS FOR A SLURRY TRANSPORTATION SYSTEM

**Will B. Jamison, Bethel Park, Pa., and Arthur B. Coval, Columbus, Ohio, assignors to Consolidation Coal Company, Pittsburgh, Pa.**

**Filed Apr. 18, 1974, Ser. No. 462,153**
**Int. Cl.[2] B55G** *53/30*
**U.S. Cl. 137—344** **10 Claims**



**1.** In an underground mine having a roof and a floor, a slurry transportation system comprising a first hose adapted to transport water and a second hose adapted to transport slurry, an input system, means for connecting said first and second hoses to said input system and output system, and means for connecting said first and second hoses to said output system, and apparatus for movably supporting said first and second hoses, comprising:

a. a rail means;

b. means attaching said rail means to the roof of said mine;

c. strapping means attached around said first and second hoses and spaced along their lengths; and,

d. means movably supported by said rail means attached to said strapping means.

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**3,920,040**

## PRESSURE CONTROL SYSTEM

**Walter W. Powell, Houston, Tex., assignor to Anderson, Greenwood & Co., Bellaire, Tex.**

**Filed Oct. 23, 1973, Ser. No. 408,855**
**Int. Cl.[2] F16K** *17/00*
**U.S. Cl. 137—458** **7 Claims**

**1.** A pressure control system for a fluid system under pressure comprising

a pressure responsive pilot valve,

means connecting the pilot valve to a fluid system to be controlled for delivering fluid under pressure from said fluid system to said pilot valve,

said pilot valve including means for presetting a preselected pressure condition at which said pilot valve responds by discharging said fluid under pressure,

an activator,

a control valve,

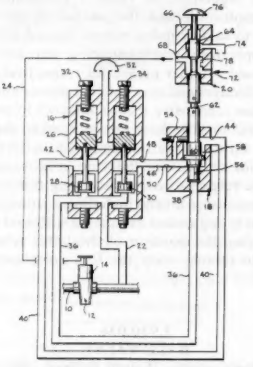
said activator being mechanically interconnected to said control valve and being responsive to fluid pressures,

means connecting said pilot valve to said activator to supply and vent said fluid under pressure discharged therefrom to said activator,

a safety device having a pressure responsive actuator,

means supplying actuating fluid under pressure to said control valve,

means connecting said control valve to said safety device actuator to control the delivery of actuating fluid to said safety device actuator whereby on occurrence of said preselected pressure condition in said fluid system said



safety device is actuated to control pressure in said fluid system,

said activator including

a body defining a central bore and end bores of reduced diameter communicating with said central bore,

a piston movably positioned within said bores, and

means providing communication into said central bore on opposite sides of said piston,

said piston including a connecting rod extending through one of said end bores and adapted to connect to said control valve,

said piston having three effective pressure areas with two of said areas being opposed to the third of said areas,

the effective pressure areas on said piston urging said piston towards shutdown direction being greater than the effective pressure areas on said piston urging said piston in the opposite direction.

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**3,920,041**

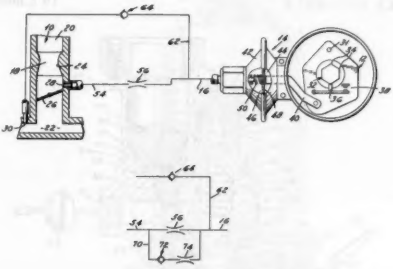
## FLUID FLOW CONTROL DEVICE

**Karl H. Gropp, Grosse Pointe Woods, Mich., assignor to Ford Motor Company, Dearborn, Mich.**

**Filed Nov. 5, 1973, Ser. No. 413,136**
**Int. Cl.[2] F02P** *5/10*
**U.S. Cl. 137—599** **5 Claims**

**1.** A fluid flow control device for use in a vacuum line connected to a source or pressure at one end varying between atmospheric and subatmospheric levels and at its other end to a fluid chamber, the device including a first flow restriction delaying communication of a pressure change at one rate from one side of the restriction to the other, a bypass line bypassing the first restriction and containing additional flow restriction means and other means in series with the additional flow restriction means rendering the latter operable concurrent

with the first restriction in response to a predetermined change in pressure on one side of the first restriction relative to the pressure on the other side, to provide at times a different rate of equalization of pressures, a second line connected at one end to a second source of pressure varying between



atmospheric and subatmospheric levels and at its other end to the fluid chamber, and further means in the second line operable in response to a predetermined pressure level at the second source to immediately equalize the pressures at the second source and fluid chamber regardless of the operativeness of the first restriction and additional restriction means.

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**3,920,042**

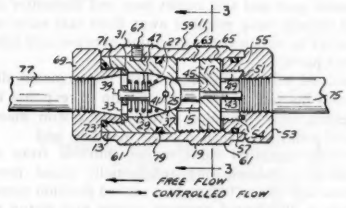
**FLOW CONTROL VALVE**

**Leland F. Blatt, 31915 Groesbeck Highway, Fraser, Mich. 48206**

**Filed Jan. 20, 1975, Ser. No. 542,348**

**Int. Cl.[2] F16K** *15/18*

**U.S. Cl. 137—523** **7 Claims**




**7.** In a flow control ball check valve having an apertured body, a seat, a yieldable ball valve biased into said seat, and caps on the ends of the body;

a rod extending through the ball valve and adjacent its ends slidably mounted upon the body; said rod having a reduced portion defining a shoulder;

a rod stop guide slidably mounted in said body receiving the reduced portion of said rod and bearing against its shoulder,

and an adjusting sleeve on said body interposed and retained between said end caps and threadedly engaging said rod stop guide, there being free flow of fluid through said body in one direction unseating and retracting said ball valve; flow in the opposite direction being checked; rotation of said sleeve relative to said body effecting longitudinal adjustments of said rod stop guide and rod for variably unseating said ball valve.

**3,920,043**

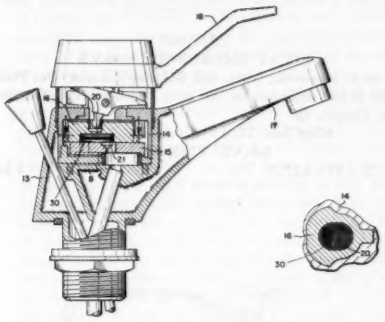
**LOW NOISE FAUCET**

**Andrew J. Fowell, Martinsville, N.J., assignor to American Standard Inc., New York, N.Y.**

**Filed Oct. 9, 1974, Ser. No. 513,209**

**Int. Cl.[2] F16K** *11/00, 19/00*

**U.S. Cl. 137—625.17** **6 Claims**



**1.** In a water faucet having a valve body with control elements formed by two disc, the first disc being stationary and having water inlet openings and water outlet opening connected on one side to a valve manifold and on the other side directed towards the second disc which is movably arranged on the first disc, the second disc having a surface cavity arranged and constructed to overlap the inlet openings and the outlet opening formed in the first disc, that improvement consisting essentially of:

noise reducing means disposed within said surface cavity of the second disc, formed of at least one screen mounted therein at a predetermined distance from the ceiling of said cavity thereby defining a noise-isolating chamber within the cavity.

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**3,920,044**

**DEVICE FOR OBTAINING QUIET OPERATION OF VALVES, MORE PARTICULARLY PRESSURE REDUCING VALVES**

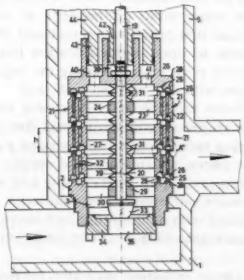
**Karl Gruner, Offenbach am Main, Germany, assignor to Samson Apparatebau A.G., Germany**

**Filed July 11, 1973, Ser. No. 378,162**

**Claims priority, application Germany, July 11, 1972, 2234053; June 14, 1973, 2330392**

**Int. Cl.[2] F15D** *1/10;* **F16K** *47/08*

**U.S. Cl. 137—625.3** **4 Claims**



**1.** A device for obtaining quiet operation of valves for flowing media, more particularly of pressure reducing valves, having a choke or valve seat opening arranged to cooperate with a choke or valve closing body having fluid flow directed

against its direction of closing, the improvement wherein the choke body has several annular outlet gaps with an adjustable gap width, which together produce the required choke cross-section, and at least one of the annular outlet gaps has at least two choke steps arranged in tandem, said choke steps being arranged on opposite sides of the choke discs and connected together by pressure equalizing ducts.

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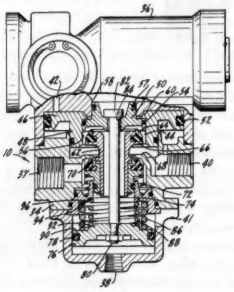
**3,920,045**

## RELAY EMERGENCY VALVE

**Charles F. Horowitz, Niles, and Boleslaw Klimek, Des Plaines, both of Ill., assignors to The Berg Manufacturing Company, Des Plaines, Ill.**

**Filed Jan. 22, 1974, Ser. No. 435,428**
**Int. Cl.² F16K *31/12***
**U.S. Cl. 137—627.5** **7 Claims**



1. A relay emergency valve including a housing having a supply port, a delivery port, a service port and a tank port, a first piston movable in said housing in response to air pressure at said service port,

a shuttle movable in said housing, said shuttle including a hollow body, generally tubular in form and including seal means disposed at an intermediate point along the length of said shuttle, said housing including an inwardly extending annular wall, said shuttle being disposed to move at least partially within said annular wall, spring means normally biasing said shuttle to close communication between said tank and delivery ports by engaging said seal means with said annular wall, movement of said first piston in response to air pressure at said service port causing said first piston to contact said shuttle and move said shuttle to open communication between said tank and delivery ports by terminating the engagement of said seal means with said annular wall, and

a second piston movable in said housing and covering said supply port, means connecting said first and second pistons, spring means biasing said second piston away from said first piston and toward said supply port, a drop in pressure at said supply port causing said second piston to move toward said supply port and move said first piston into contact with said shuttle and move said shuttle to open communication between said tank and delivery ports

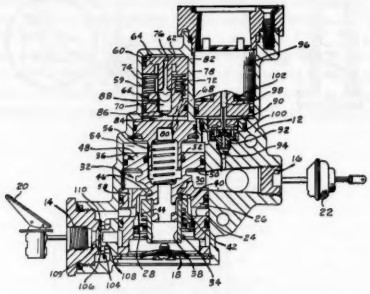
said first piston including an outer portion and an inner portion, with said inner portion being connected to said second piston, said shuttle including an annular seal at one end thereof for engaging said inner portion of said first piston, and said shuttle selectively providing communication between said delivery port and said exhaust port through its hollow body.

**3,920,046**

## ADAPTIVE BRAKING MODULATOR FOR AIR-BRAKED VEHICLES

**Robert J. Morse, and Milan J. Sebo, both of Elyria, Ohio, assignors to The Bendix Corporation, South Bend, Ind.**

**Continuation of Ser. No. 199,109, Nov. 16, 1971, abandoned. This application Jan. 17, 1974, Ser. No. 434,171**
**Int. Cl.² B60T *8/10***
**U.S. Cl. 137—627.5** **18 Claims**



1. In a modulator for an adaptive braking system:

a housing defining a bore therewithin having an inlet port, an outlet port, and an exhaust port;

pressure responsive valve means within said bore for controlling communication between said inlet port and said outlet port and between said outlet port and said exhaust port;

said pressure responsive valve means including a valve seating member dividing said bore into an inlet chamber and an outlet chamber, first and second valve members cooperating with said valve seating member, first resilient means yieldably urging said first valve member into sealing engagement with said valve seating member to prevent fluid communication between said inlet and outlet ports, second resilient means yieldably urging said second valve member into sealing engagement with said first valve member to terminate communication between said exhaust port and said outlet port and thereafter urging said second valve member away from said valve seatng member to permit communication between said inlet and outlet ports;

**said second valve member including piston means slidable in said housing and moving therein in response to differential fluid pressure across said piston means to thereby shift said second vavle member; and**

electrically operated valve means shiftable from a first position communicating substantially equal pressures across said piston means to a second position communicating a differential pressure across said piston means whereupon said second valve member permits said first resilient means to urge the first valve member into sealing engagement with said seat to prevent fluid communication between said inlet and outlet ports.

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**3,920,047**

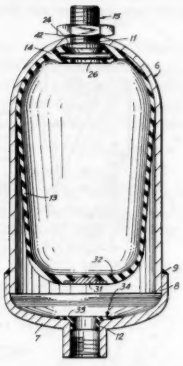
## GAS FITTING FOR PRESSURE ACCUMULATOR

**Jacques H. Mercier, 49 Rue de Naples, Paris, France**

**Filed Mar. 22, 1974, Ser. No. 453,599**
**Int. Cl.² F16L *55/04***
**U.S. Cl. 138—30** **4 Claims**

1. A bladder assembly for a pressure vessel comprising a bladder and a fitting, said bladder being of resilient deformable material, substantially circular in cross section and having a thickened portion at one end axially aligned with the longitudinal axis of the bladder, said thickened portion having an axial bore therethrough, said axial bore having an annular groove in the wall thereof, said fitting being of rigid material comprising a stem portion with a base disc at one end having

an outstanding annular flange of diameter substantially equal to the diameter of said annular groove to be accommodated therein, said fitting having a cylindrical hub portion integral therewith between the root end of the stem portion and said base disc, said hub portion being of diameter greater than that of said stem portion and less than that of said base disc, the junction betwen said hub and the root end of said stem defining an annular shoulder substantially aligned with the plane of the outer end of said axial bore, the outer surface of said bladder adjacent the bore and encompassing the latter having an outstanding annular bead rising above the plane of the annular shoulder defined by the hub and a clearance space defined in said fitting adjacent the inner end of said bore, between the base disc and the adjacent portion of the bladder.



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**3,920,048**

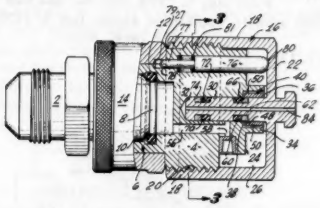
## RELEASABLE CLOSURE ASSEMBLY INCORPORATING PRESSURE BLEED-OFF

**Ray E. Mingus, Mission Viejo, Calif., assignor to Kaiser Aerospace and Electronics Corporation, Irvine, Calif.**

**Filed Feb. 27, 1974, Ser. No. 446,149**

**Int. Cl. F16l** *57/00*

**U.S. Cl. 138—89** **15 Claims**



**1.** A releasable closure assembly for closing an end of a conduit, having a hollow interior, in which fluid pressure greater than atmosphere may build up, which enables the pressure in the conduit to be bled off before the end of the conduit is uncovered, the closure assembly comprising:

a housing extending in an axial direction, said housing having one axial end adapted for releasable connection to the conduit to close the end thereof, said housing having,

an internal first chamber which communicates with the interior of the conduit when the housing is connected thereto;

a cap mounted on said housing adjacent an opposite axial end thereof for selective movement relative to said housing in opposite axial directions, portions of said cap being spaced from adjacent portions of said housing to define a second chamber;

at least one of said cap and said housing having,

an opening therein extending between said second chamber and the atmosphere;

an axially extending bore in said housing,

a plunger operatively connected with said cap extending into said bore for motion therealong in opposite axial directions when said cap is moved in the opposite direction relative to said housing;

first and second passage means in said housing intersecting said bore at first and second locations spaced axially apart to define a gap therebetween, for separately placing said bore in fluid communication with said first and second chambers, respectively; and

seal means carried by said plunger for providing a continuous peripheral seal between said plunger and said bore, said seal means being positioned in the gap between said first and second locations thereby preventing fluid flow between said chambers via said bore when said cap is positioned in one axial position relative to said housing, said seal means being carried along said bore by said plunger beyond the gap between said first and second locations when said cap is moved to another axial position thereof relative to said housing thereby placing said first and second chambers in fluid communication to enable the built-up fluid pressure in the conduit to bleed to atmosphere before said housing is released from the conduit.

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**3,920,049**

## FIBER-REINFORCED PLASTICS TUBE

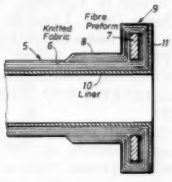
**Axel Lippert; Siegfried Joisten, and Johannes-Otto Sajben, all of Krefeld, Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany**

**Filed Jan. 16, 1973, Ser. No. 324,043**

**Claims priority, application Germany, Jan. 18, 1972, 2202125**

**Int. Cl.² F16L** *09/12, 11/02, 11/04*

**U.S. Cl. 138—109** **8 Claims**



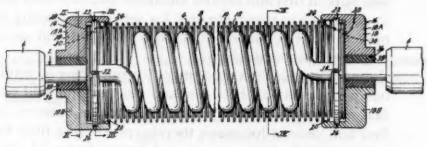

**1.** A fibre-reinforced plastic tube, comprising a duroplastic material with a fibre reinforcement composed of at least one tubular, seamless knitted fabric impregnated with the duroplastic material, wherein the ends of the tube are provided with flanges, the tubular knitted fabric extending radially outwards in a plane substantially perpendicular to the axis of the tube, a circular insert disposed concentrically about said tube and laid up on, and forming a backing and support for the part of the knitted fabric which extends radially outwardly, the radially outwardly extending knitted fabric, being impregnated with a duroplastic material, the radially outwardly extending fabric, its impregnating material, and the circular insert being combined to form the flange.

**3,920,050**

## SHROUD FOR COILED HOSES

George D. Nichol, 411 Washington St., Pittsfield, Ill. 62363, and John C. Schmidt, 2307 Castilla Isle, Fort Lauderdale, Fla. 33301

Filed Apr. 1, 1974, Ser. No. 456,966
Int. Cl.[2] F16L *57/00*
U.S. Cl. 138—110 4 Claims



1. A shroud for a flexible, resilient hose having a portion thereof formed in a helical coil whereby to be resiliently extendable and retractable in effective length, said shroud comprising:

a. a helical coil of resilient wire adapted to be disposed generally concentrically with said hose in surrounding relation to the coiled portion of said hose, said wire coil being formed of wire having a much smaller diameter than said hose, and being wound with a great many more turns per inch than the coiled portion of said hose, whereby to constitute in skeleton form a sheath having a surface as continuous as reasonably possible, and

b. attaching means joined to each end of said wire coil and adapted to be clamped to said hose adjacent the coiled portion of said hose, said attaching means at each end of said wire coil comprising a retainer ring connected to said wire coil concentrically therewith and having an internal diameter sufficiently large to be passed longitudinally over the coiled portion of said hose, and a body member engaged with said retainer ring and including means operable to engage clampingly about said hose adjacent the coiled portion thereof.

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**3,920,051**

## CORROSION RESISTANT CONTINUOUS WELD PIPE

John Ray Bell, Grosse Ile Township, Wayne County, Mich., and Richard James Cover, Upper St. Clair Township, Allegheny County, Pa., assignors to Jones & Laughlin Steel Corporation, Pittsburgh, Pa.

Filed Aug. 20, 1974, Ser. No. 498,897
Int. Cl.[2] F16L *9/02*; C22C *38/42*
U.S. Cl. 138—155 4 Claims

1. A continuously butt welded alloy steel pipe comprising: a steel consisting essentially of 0.08% maximum carbon, 0.50% maximum manganese, 0.05 to 0.09% phosphorous, 0.90 to 1.20% chromium, 0.05% maximum silicon, 0.25 to 0.50% copper, 0.30 to 0.50% nickel and balance iron and having corrosion resistance substantially superior to continuously welded carbon steel pipe and having high weld ductility.

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**3,920,052**

## TERRY WARP FEEDING APPARATUS

Howard I. Nelson, Grafton, Mass., assignor to Crompton & Knowles Corporation, Worcester, Mass.

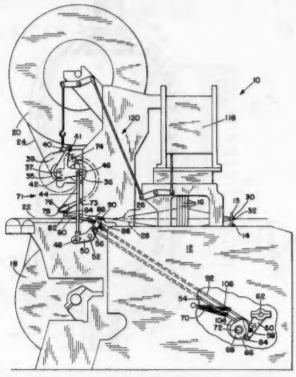
Filed Oct. 23, 1973, Ser. No. 408,351
Int. Cl.[2] D03D *39/22*, *49/12*
U.S. Cl. 139—25 6 Claims

1. In a terry loom having a supply beam for terry warp and a reed which is reciprocated in cycles of partial beat-ups followed by a full beat-up at which time terry loops are formed, feeding means for the terry warp comprising:

a. positive feed means for drawing terry warp from said supply beam at the same rate for partial beat-ups and full beat-ups;

b. a movably mounted compensator having a surface for engaging said terry warp between said positive feed means and reed; and

c. actuating means driven in timed relation with said reed for moving said compensator so that said surface is



moved toward terry warp to maintain them under tension during the portion of each terry cycle when terry loops are not being formed and away from said terry warp to release terry warp for loop forming during the portion of each terry cycle when terry loops are being formed.

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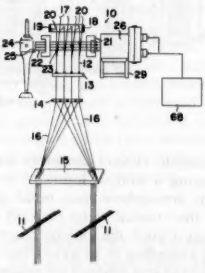
**3,920,053**

## DEVICE FOR USE WITH JACQUARD MACHINE FOR SELECTIVELY LIFTING WARP YARNS

Hitoshi Akami; Masaya Nakazima, both of Yokohama, and Masayoshi Katsumata, Machida, all of Japan, assignors to Agency of Industrial Science & Technology and Kayabakogyokabushikikaisha, both of Tokyo, Japan

Filed July 1, 1974, Ser. No. 484,949
Claims priority, application Japan, July 3, 1973, 48-75071
Int. Cl.[2] D03C *3/20*
U.S. Cl. 139—319 4 Claims



1. In a Jacquard machine, having a power loom, a device for selectively lifting warp yarns, comprising

a. a selection mechanism disposed in opposed relation with a plurality of needles of said Jacquard machine, said selection mechanism comprising

a plurality of armature members coupled through wire members to said plurality of needles, respectively.

a plurality of solenoids disposed in opposed relation with said plurality of armature members, respectively, and

driving means coupled to said power loom and movable in response to operation of said loom for causing said plurality of armature members and said plurality of solenoids to move toward or away from each other in synchronism with the weaving operation of said power loom; and

b. a control unit for energizing the solenoids selected in response to the fabric pattern information so as to attract the armature members, whereby the displacements of the needles coupled to the armature members attracted by the energized solenoids may be controlled.

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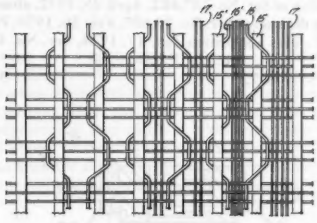
**3,920,054**

## CURVILINEAR WAISTBAND FABRIC

**Richard Everett Goff, Jr., Barrington, and Normand Daniel Guay, Woonsocket, both of R.I., assignors to Johnson & Johnson, New Brunswick, N.J.**

**Filed May 29, 1974, Ser. No. 474,277**
**Int. Cl.² D03D** *15/08, 3/00*
**U.S. Cl. 139—421** **10 Claims**



**1.** A lightweight, curvilinear, narrow elastic waistband fabric consisting of three sets of warp yarns, woven with a set of filing yarns, the yarns of the first warp set are elastic yarns selected from the group consisting of rubber core yarns and spandex core yarns, the yarns of the second warp set are doup warp yarns other than elastic yarns, the yarans of the first and second warp sets are woven in a reverse leno weave with each elastic yarn leno woven with a yarn other than elastic yarn with adjacent elastic yarns being disposed on opposite faces of the fabric, and the yarns of the third warp set are disposed in a graduated manner between the yarns of the first and second warp sets from the center of the fabric to one longitudinal edge thereof.

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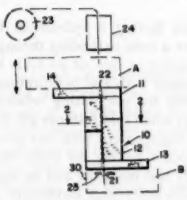
**3,920,055**

## STRAIGHTENING DEVICE

**David I. Cropp, 501 Chestnut St., Meadville, Pa. 16335**

**Filed Nov. 18, 1974, Ser. No. 524,417**
**Int. Cl.² B21F** *23/00*
**U.S. Cl. 140—147** **5 Claims**



**1.** A wire guide comprising a fixed member and a movable member,

said fixed member having a base and a plurality of wedge shaped column members extending upwardly therefrom, a movable member adapted to be fixed to a movable member,

said movable member having at least three wedge shaped column members thereon extending downwardly,

said wedge shaped column members on said movable member interfitting with said column members on said fixed member and slidably engaging complementary lateral surfaces on said column members on said fixed member, whereby said column members on said movable member are guided relative to said column members on said base, and a bore extending through said fixed member and through said movable member defined by the ends of said wedge shaped members on said base and the tips of said wedge shaped members on said movable member, whereby a wire may be moved down with said movable member and be guided by said base member,

said tips of said wedge shaped members on said movable member and said tips of said wedge shaped member on said fixed member each defining segments of a surface defining said bore,

the center of each said segment of said movable member being spaced from each other around said bore at positions more than 90° from each other.

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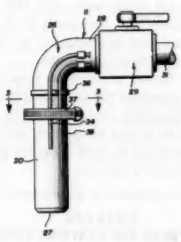
**3,920,056**

## PORTABLE AUTOMATIC DRUM FILLING APPARATUS

**John A. Piecuch, Oak Forest, Ill., assignor to Nalco Chemical Company, Chicago, Ill.**

**Filed July 10, 1974, Ser. No. 487,214**
**Int. Cl.² B65B** *3/24*
**U.S. Cl. 141—94** **13 Claims**

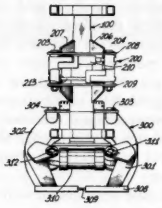


**1.** An automatic container filling apparatus for filling a container comprising, a valve having an inlet and an outlet, means connecting the inlet to a product supply, a filling nozzle and product level detecting assembly including a filling nozzle and a pair of fluidic product level sensing probes for detecting different product levels during the filling of the container with product, means connecting the valve outlet to the filling nozzle, a pneumatic actuator for driving the valve between full open, intermediate and closed positions, means for producing a start signal, and fluid logic circuit means responding to the start signal to cause the actuator to drive the valve to full open position and to the product level sensing probes to cause the actuator to drive the valve to intermediate and closed positions as the product level rises and successively covers the probes, said circuit including means preventing the actuator from driving the valve to full open position in response to the start signal if the valve is in intermediate position.

## 3,920,057
## FELLING HEAD

**Douglas D. Hamilton, Mount Royal, and Joseph J. R. Boivin, Montreal, both of Canada, assignors to Logging Development Corporation, Montreal, Canada**

**Filed Feb. 25, 1975, Ser. No. 552,879**
**Claims priority, application Canada, Mar. 14, 1974, 195031; Mar. 4, 1974, 193978**
**Int. Cl.² A01G** *23/02*
**U.S. Cl. 144—34 E** **10 Claims**



1. A tree felling head adapted to be mounted on the free end of an extendible and retractable boom for felling standing trees comprising:

a. an arcuate rigid frame terminating respectively at opposite ends in an upper and lower tree engaging abutment member;

b. four arms each pivotally mounted on said frame at a position between said upper and lower abutments by respective ones of four pivot pins spaced apart from one another in a direction transverse to the pivot axes thereof, two of said arms being curved and projecting forwardly from the central portion of the frame providing a grapple for grasping the trunk of a standing tree at a position between the upper and lower abutments and pressing the same against such abutments and the other two arms sloping downwardly and forwardly from the central portion of the frame and terminating in free end portions located below the lower abutment;

c. a pair of shear blades secured to respective ones of the latter two arms adjacent the free ends thereof for severing the trunk of a standing tree grasped by the grapple at a position below the lower abutment; and

power means connected to said arms for pivoting the same about their respective pivots.

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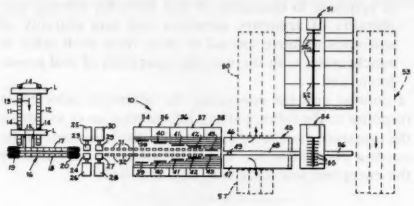
## 3,920,058
## METHOD OF SAWING LOGS

**Willard H. Walker, 36739 Magnolia St., Newark, Calif. 94560**

**Continuation-in-part of Ser. No. 117,442, Feb. 22, 1971, Pat. No. 3,738,404. This application June 12, 1973, Ser. No. 369,127**
**Int. Cl.² B27B** *1/00*
**U.S. Cl. 144—312** **8 Claims**

1. A method of sawing small logs of various diameter sizes into finished lumber comprising the steps of conveying each log along a linear path of travel, chipping two notches in the bottom of the log's periphery to form two support surfaces thereon extending in the same substantially horizontal plane and two surfaces perpendicular to the support surfaces, planing the log surfaces formed by the two notches, employing the planed surfaces of the log at the notches as bearing surfaces to guide the log along the linear path of travel through the first subsequent sawing operation, sawing the log with planer saws on planes perpendicular to the substantially horizontal plane of the support surfaces to divide the log into a series of slabs with those slabs removed inwardly from the outermost slabs having thicknesses corresponding to finished lumber strips and the center slab having a thickness from which finished dimensional lumber can be cut, sawing the slabs with planer edger saws to form finished strips or boards, and sawing the



center slab of the log with planer saws to form finished dimensional lumber.

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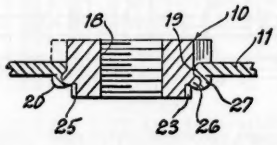
## 3,920,059
## COMBINATION OF RELATIVELY THIN SHEET OF METAL AND PIERCE NUT

**William L. Grube, Lake Bluff, Ill., assignor to MacLean-Fogg Lock Nut Co., Mundelein, Ill.**

**Continuation of Ser. No. 247,462, April 25, 1972, abandoned, which is a division of Ser. No. 13,007, Feb. 20, 1970, Pat. No. 3,693,237. This application Jan. 17, 1974, Ser. No. 434,197**
**Int. Cl.² F16B** *37/04*
**U.S. Cl. 151—41.72** **3 Claims**



1. A sheet metal panel and a metal part of greater thickness than the sheet metal panel rigidly secured to said panel, said metal part having a bore and an abutment overlying one side of said panel, said metal part extending through said panel, and said panel and metal part having overlapping portions thereof extending laterally of the metal part on the other side of said panel, said overlapping portions together constituting for the major part adjacent the metal part a boss having an exterior surface in the form of a frusto-sphere the plane of the frustum substantially coinciding with the surface of the panel adjacent said metal part

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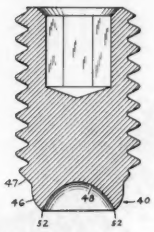
## 3,920,060
## CUP-POINT FASTENER

**Ernest J. Heldmann, Wethersfield, and Terry D. Capuano, Newington, both of Conn., assignors to Veeder Industries, Inc., Hartford, Conn.**

**Filed July 11, 1973, Ser. No. 378,145**
**Int. Cl.² F16B** *39/282, 35/04*
**U.S. Cl. 151—70** **7 Claims**

1. A fastener pin having a cylindrical body portion for engaging the wall of a bore extending through a first member and having a cup-point at one of its ends integrally formed therein for engagement with and penetration into the surface of a second member for preventing relative movement between said members when said fastener pin is inserted through said bore and is in engagement with and penetrating into said surface, said cup-point having an outer flank continuously curving downwardly and inwardly and an inner flank continuously sloping downwardly and outwardly which meet and terminate in a surface engaging and penetrating edge extending circularly around and spaced radially outwardly from the vertical axis of said pin, said curving outer flank and said inner

flank forming therebetween a wedge extending upwardly from said edge, said wedge progressively increasing in thickness upwardly from said edge, the ratio of the thickness of the inner wedge segment to the thickness of the outer wedge segment, when said wedge is divided by a line parallel to the pin axis and passing through the inner and outer flank intersection point, increasing by about 20% when measured in planes parallel to the plane of said edge at intervals of 20% between said plane




of said edge and a plane parallel to said edge at a distance from said edge plane about 20% of the diameter of said cavity opening when measured beginning at said surface engaging and penetrating edge, the thickness of the inner and outer wedge segments in said plane at a distance from said edge plane of about 20% being substantially equal and the combined thickness of said segments being substantially equal to the distance of said plane from said edge plane.

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**3,920,061**

## PNEUMATIC TIRE AND WHEEL ASSEMBLIES

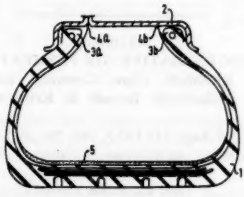
**Michael Peter Japp, and Geoffrey Lionel Coulter, both of Sutton Coldfield, England, assignors to Dunlop Limited, England**

**Filed July 3, 1973, Ser. No. 383,470**

**Claims priority, application United Kingdom, July 29, 1972, 35577/72**

**Int. Cl.**[2] **B60C** *17/00, 21/08*

**U.S. Cl. 152—330 RF** **16 Claims**




**1.** A pneumatic tire and wheel assembly containing a lubricant composition for lubricating the internal surfaces of the assembly when in use in a deflated or substantially underinflated condition, said lubricant composition including a volatile component to at least partially reinflate the tire and puncture sealing material selected from shredded polyethylene and ground polystryene foam, said material having a density relative to that of the composition in the range 0.7 to 1.3 and comprises particles having a size such that they will just pass through a sieve having 3 mm apertures.

**3,920,062**

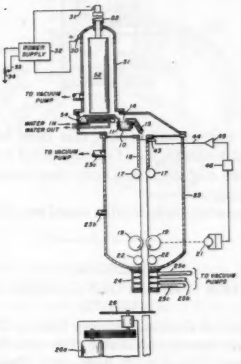
## CONTROL METHOD FOR CONTINUOUSLY CASTING LIQUID METAL PRODUCED FROM CONSUMABLE ELECTRODES

**Ferhun H. Soykan; John S. Huntington, and Falih N. Darmara, all of New Hartford, N.Y., assignors to Special Metals Corporation, New Hartford, N.Y.**

**Division of Ser. No. 294,746, Oct. 3, 1972, Pat. No. 3,847,205. This application Sept. 5, 1974, Ser. No. 503,408**

**Int. Cl.**[2] **B22D** *27/02*

**U.S. Cl. 164—4** **8 Claims**



**1.** A method of continuously casting pre-alloyed metal supplied from a consumable electrode comprising the steps of:

providing a consumable electrode from a metal ingot corresponding to the desired metallurgical composition of a billet to be continuously cast,

striking an arc to melt said consumable electrode,

adjusting the gap between said consumable electrode and a second electrode to maintain an arc therebetween,

providing a controlled atmosphere for the melting of said consumable electrode,

controlling the melting rate by adjusting the power input to said consumable electrode according to a predetermined solidification rate of said ultimately solidified billet,

delivering said molten metal continuously into a fluid cooled mold,

continuously withdrawing a partially solidified billet from said mold,

further cooling said billet to form a solidified casting within said controlled atmosphere, and

continuously discharging said solidified casting from said controlled atmosphere.

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**3,920,063**

## TOP POURING INGOT MAKING METHOD USING COVER FLUX

**Kantaro Sasaki, Ashiya, and Mitsuo Oda, Oyamazaki, both of Japan, assignors to Sumitomo Metal Industries, Ltd., Osaka and Aikoh Co., Ltd., Tokyo, both of, Japan**

**Filed Nov. 7, 1973, Ser. No. 413,639**

**Claims priority, application Japan, Mar. 24, 1973, 48-33760; July 31, 1973, 48-86571**

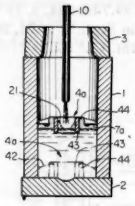
**Int. Cl.**[2] **B22D** *7/12, 23/02*

**U.S. Cl. 164—55** **15 Claims**

**1.** A method of pouring a metal ingot in a mold having an upright wall and a bottom wall, which method comprises:

A. placing a tubular float within an ingot on the bottom wall prior to initiation of pouring of molten metal in said mold, said tubular float having annularly disposed thereabout a

contained flux supply, said flux being released upon contact with molten metal for passage to the surface of the molten metal between outer surfaces of the tubular float and said upright wall, said float consisting of a material lighter than said molten metal and solid at the temperature of said molten metal, said float being buoyantly supported by said body of molten metal and rising in said mold as the surface of said body rises during said continuous pouring; and



B. pouring continuously molten metal into the tubular float.

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**3,920,064**

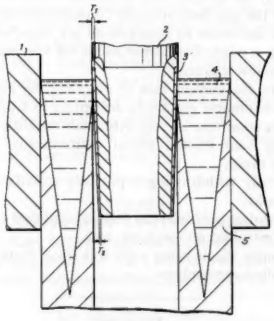
**MANDREL FOR CONTINUOUS CASTING OF HOLLOW INGOTS**

**Vitaly Yakovlevich Genkin, Sirenevy bulvar, 27, korpus 3, kv. 27; Vladimir Borisovich Gankin, Ulitsa N. Maslovka, 8, kv. 203; Alexandr Georgievich Budkevich, Svobodny prospekt 22, korpus 2, kv. 113, and Vladimir Efremovich Sirota, Volgogradsky prospekt, 115, korpus 2, kv. 9, all of, Moscow, U.S.S.R.**

**Filed May 8, 1973, Ser. No. 358,363**

**Int. Cl.[2] B22D** *11/02*

**U.S. Cl. 164—273 R** **1 Claim**



1. A mandrel for the continuous casting of downwardly conveyed hollow ingots comprising a downwardly tapered section located in the zone of contact with liquid metal and having a coating of a metal provided on the tapered section whose coefficient of thermal conductivity is lower than that of the metal from which said mandrel is manufactured, with the thickness of said coating diminishing uniformly from the upper end of the tapered section along the length of the mandrel to the lower end thereof in the direction of downward motion of the ingot, the ratio of the thickness of the coating at the upper end of the tapered section relative to the thickness of the coating at the lower end thereof ranging from 1:50 to 1:150.

**3,920,065**

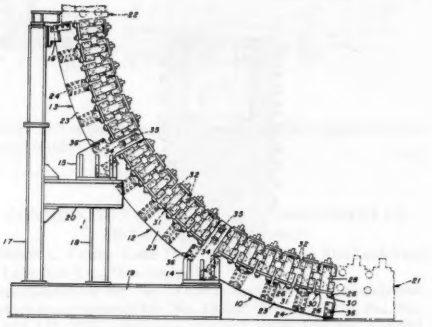
**CURVED ROLL RACK**

**John T. Hall, Pine Township, Porter County, Ind., and George J. Wagner, Jr., North Fayette Township, Allegheny County, Pa., assignors to United States Steel Corporation, Pittsburgh, Pa.**

**Filed Aug. 27, 1973, Ser. No. 392,170**

**Int. Cl.[2] B22D** *11/12*

**U.S. Cl. 164—282** **5 Claims**



1. In a curved roll-rack which includes arcuate frame sections each having a concave edge, means supporting said frame sections, bottom and top idler rolls, and means on said frame sections supporting said rolls, whereby the rolls define a curved path through which a workpiece may travel,

the improvement in which the supporting means for said rolls include:

pads fixed to said frame sections along the concave edges thereof;

opposed support members of inverted T-shape having cross bars fixed to said pads and uprights which form rails and extend radially from said concave edges toward the center of curvature of the frame sections;

bearings in which said rolls are journaled;

bottom and top chocks in which said bearings are mounted; said chocks being slidably supported on said rails outside the concave edges of said frame sections; and

means holding said chocks on said rails;

said chocks being removable from said rails without disturbing said members;

whereby the rolls automatically drop into their proper positions when replaced after removal.

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**3,920,066**

**REGENERATIVE AIR PREHEATER**

**Franz Josef Kirchhoff, Olpe, Germany, assignor to Apparatebau Rothemuhle Brandt & Kritzler, Rothemuhle, Germany**

**Filed Aug. 31, 1973, Ser. No. 393,432**

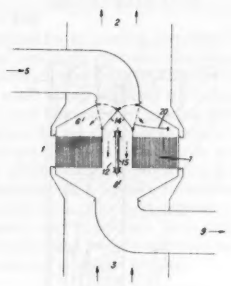
**Claims priority, application Germany, Sept. 1, 1972, 323172[U]**

**Int. Cl. F28d** *17/00*

**U.S. Cl. 165—4** **1 Claim**

1. In a regenerative air preheater with a stationary regenerative mass having two end faces, two hoods rotatable about an axis over each said end face respectively to communicate one of the heat-exchange media to and from the mass, and a bypass for at least one of the media the improvement comprising a hollow core of the mass at the axis of rotation of the hoods and extending continuously from end face to end face of the mass and forming a gas-passing bypass duct completely through the axial length of the mass, a central portion of each of the two hoods communicable with an end of the bypass duct, and variable obturator means operable to vary the relative amounts of flow to the said one of the media through the

mass and through the bypass duct wherein said obturator means comprises movable flaps at one end of the duct and



operable also positively to prevent flow through one of the mass and the bypass duct.

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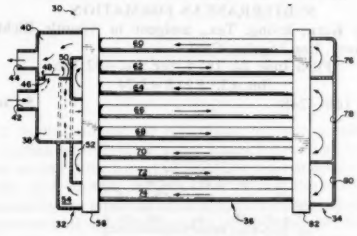
**3,920,067**

## HEAT EXCHANGER FOR CONTINUOUS FLOW FLUID HEATER

**Herbert Schindler, North Hollywood, and Willard O. Ware, Stockton, both of Calif., assignors to M.M.S. Limited, Alameda, Calif.**

**Filed Apr. 11, 1973, Ser. No. 350,097**
**Int. Cl.[2] G05D** *15/00*
**U.S. Cl. 165—38** **18 Claims**



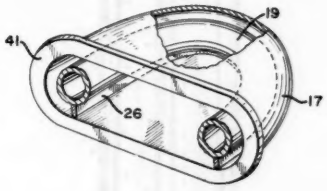
**1.** A continuous flow fluid heater comprising: heat exchange means, means defining an outlet for delivering fluid to be heated to said heat exchange means and means defining an outlet for receiving heated fluid from said heat exchange means and delivering said heated fluid therefrom, means defining a by-pass passage capable of diverting continuously a selected portion of said fluid to be heated from said inlet to said outlet independent of said heat exchange means, and flow control means arranged at said by-pass passage adjustably to control the quantity of diverted fluid between a minimum quantity and a variable quantity related to pressure conditions within said inlet, said flow control means comprising resilient deflectable baffle and means for securing said a resilient baffle positioned over said by-pass passage and spaced therefrom to define a minimum clearance passage effective to maintain continuous fluid flow through said by-pass passage, said baffle being deflectable about an axis spaced from said by-pass passage.

**3,920,068**

## CONCENTRIC DOUBLE-PIPE HORIZONTAL HEAT EXCHANGER FOR FIBER CONTAINING FLUIDS

**John Joseph Walsh, Parsippany, N.J.; Elmer Allen Hayes, Montpelier, Idaho, and Jan Schmidt, Amstelveen, Netherlands, assignors to Dorr-Oliver Incorporated, Stamford, Conn.**

**Filed June 22, 1973, Ser. No. 372,630**
**Int. Cl.[2] F28F** *9/26*
**U.S. Cl. 165—143** **9 Claims**



**1.** A horizontal fluid heat exchanger treating fiber-containing fluids comprising a plurality of runs of substantially concentric pipes for accommodating a flow of fluid at one temperature through a central pipe and a flow of fiber-containing fluid at a different temperature through an annular channel between said pipes to thereby effect heat exchange between said fluids, the central pipe being supported in position by a continuous, relatively smooth-surfaced fin secured to at least one of said pipes and in contact with the other of said pipes, said support fin being at least coextensive in length with the flow path of the fluid in the said annular channel without significantly affecting the length of said flow path whereby said annular channel is made less susceptible to plugging by fibers.

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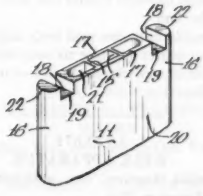
**3,920,069**

## HEAT EXCHANGER

**James A. Mosier, Racine, Wis., assignor to Modine Manufacturing Company, Racine, Wis.**

**Filed Mar. 28, 1974, Ser. No. 455,542**
**Int. Cl.[2] F28F** *9/02*
**U.S. Cl. 165—150** **11 Claims**

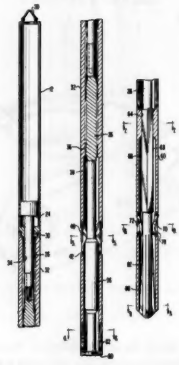


**1.** A heat exchanger, comprising: an oval tube having side walls and opposite ends that are thick relative to the thickness of each said side wall, each said end having a recess located between the sides thereof in the space between the interior of the tube and the outer edge surface of the tube; a tube header having an opening embracing said tube in the area between said recesses; and means anchoring said header in said recesses.

## 3,920,070
## PIPE CUTTER

Mack Goins, 577 Contour Drive, Lake Charles, La. 70601

Filed Nov. 6, 1974, Ser. No. 521,473
Int. Cl.² E21B 29/00
U.S. Cl. 166—55.8 13 Claims



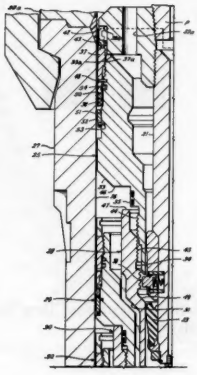
1. Apparatus for cutting pipe internally comprising:
an elongated body adapted to be received within the pipe;
an elongated element within said body and axially movable relative thereto;
means carried by said body movable from a retracted position to a laterally extended position for gripping the interior wall of the pipe;
a cutter carried by said body for rotational movement about the axis thereof and movable from a retracted position to a laterally extended position for cutting engagement with the pipe wall;
first means carried by said element and engageable with said gripping means for displacing said gripping means from its retracted position to its laterally extended position in response to displacement of said element relative to said body in one axial direction;
second means carried by said element and engageable with said cutter for displacing said cutter from its retracted position to its laterally extended position in response to displacement of said element relative to said body in said one axial direction;
means cooperable between said body and said elements for displacing said element in said one axial direction relative to said body; and
means cooperable between said body and said element for rotating said cutter relative to said body in response to displacement of said element relative to said body in said one axial direction.

## 3,920,071
## WELL APPARATUS

Eugene J. Cegielski, Houston, Tex., assignor to Cameron Iron Works, Inc., Houston, Tex.

Filed June 19, 1974, Ser. No. 480,755
Int. Cl.² E21B 23/06, 33/035
U.S. Cl. 166—182 20 Claims

10. Apparatus for use in a wellhead, comprising a member adapted to be lowered into a landed position within the bore of the wellhead, and a tool including a body adapted to be arranged telescopically with respect to the member, at least one latch member carried by the body for movement between extended and retracted positions, and means yieldably urging each latch member to extended position, said member having a downwardly facing shoulder on its lower end, and each said latch member having an upwardly facing shoulder thereon disposable beneath the shoulder on the member, when said

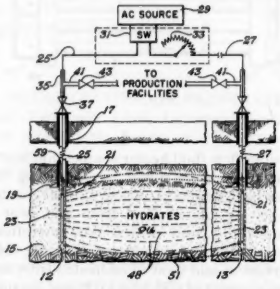


tool body is so arranged and said latch member is so extended, so as to support said member for lowering therewith, and a downwardly facing shoulder thereon beneath said upwardly facing shoulder.

## 3,920,072
## METHOD OF PRODUCING OIL FROM A SUBTERRANEAN FORMATION

Loyd R. Kern, Irving, Tex., assignor to Atlantic Richfield Company, Los Angeles, Calif.

Filed June 24, 1974, Ser. No. 482,156
Int. Cl.² E21B 43/24
U.S. Cl. 166—248 5 Claims




1. A method of increasing the oil production rate from a subterranean oil bearing formation which contains solid gas hydrate comprising melting said hydrates in said formation to free natural gas in situ; said melting of said hydrate including the step of heating said formation and said hydrate; said heating being effected by electrical conduction comprising passing through said formation an electrical current of sufficient magnitude to heat said formation and said hydrates sufficiently to effect melting of said hydrate in situ.

3,920,073

## MISCIBLE FLOODING PROCESS

Leroy W. Holm, Fullerton, Calif., assignor to Union Oil Company of California, Brea, Calif.

Filed Mar. 26, 1973, Ser. No. 345,184
Int. Cl.[2] E21B 43/16
U.S. Cl. 166—274 17 Claims

1. In the method for recovering petroleum from a subterranean reservoir containing excessive amounts of metal cations in which a soluble oil miscible with both the connate reservoir oil and with water is injected into the reservoir through an injection well, and thereafter an aqueous flooding medium is injected to drive the miscible displacement fluid towards a spaced production well from which fluids are recovered, the improvement which comprises employing a soluble oil comprising an admixture of a liquid hydrocarbon, preferentially oil-soluble surface active alkyl aryl sulfonates, a liquid organic stabilizing agent, and a sulfated surfactant comprising an admixture of ammonium lauryl polyethoxy sulfate having 2 to 6 ethoxy groups and an amide builder.

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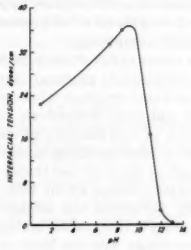
3,920,074

## METHOD FOR IMPROVING THE INJECTIVITY OF WATER INJECTION WELLS

Amir M. Sarem, Yorba Linda, Calif., assignor to Union Oil Company of California, Brea, Calif.

Filed Apr. 19, 1974, Ser. No. 462,585
Int. Cl.[2] E21B 43/22
U.S. Cl. 166—274 12 Claims




1. In the method for recovering oil from a subterranean formation wherein flood water is injected through an injection well and oil is recovered from one or more spaced production wells, and wherein the injection of said flood water is restricted by the presence of oil in the formation adjacent to the injection well, the improvement which comprises introducing through said injection well about 0.1 to 10 barrels per foot of vertical thickness of said formation of a dilute aqueous solution of an alkaline alkali metal silicate containing about 0.005 to 0.8 weight percent of said alkaline alkali metal silicate and having a molar ratio of $M_2O/SiO_2$ of 1 or above wherein M is an alkali metal atom, and thereafter injecting flood water to displace said solution into the formation.

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3,920,075

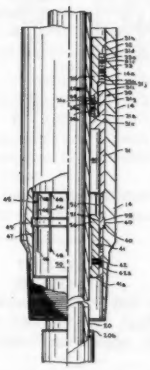
## METHOD FOR POSITIONING A LINER ON A TUBULAR MEMBER IN A WELL BORE WITH A RETRIEVABLE PACK OFF BUSHING THEREBETWEEN

Britt O. Braddick, Houston, and Hiram E. Lindsey, Midland, both of Tex., assignors to Texas Iron Works, Inc., Houston, Tex.

Filed Feb. 8, 1974, Ser. No. 440,714
Int. Cl.[2] E21B 33/13
U.S. Cl. 166—290 6 Claims

1. A method of positioning a liner on a well string in a well bore comprising the steps of:

a. securing the liner on the well string;
b. locking a seal bushing in position between the liner and the well string to seal off therebetween;
c. lowering the well string and liner to a desired position in the well bore;
d. rotating the well string relative to the liner to disengage the liner from the well string;



e. discharing a bonding agent from the well string and into the well bore around the liner; and
f. thereafter moving the well string longitudinally of the liner to unlock the seal bushing, and
g. retrieving the well string and seal bushing from the well bore.

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3,920,076

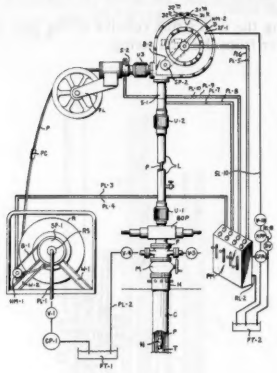
## METHOD FOR INSERTING FLEXIBLE PIPE INTO WELLS

Tibor Laky, Dallas, Tex., assignor to Otis Engineering Corporation, Dallas, Tex.

Division of Ser. No. 300,831, Oct. 25, 1972, abandoned. This application June 27, 1974, Ser. No. 483,893
Int. Cl.[2] E21B 23/00, 33/03, 43/00
U.S. Cl. 166—315 4 Claims

1. A method of injecting soft flexible conduit into a well against the well pressure confined in the well including: forming a closed chamber communicating at one end with the bore of the well in fluid pressure communication therewith; closing the other end of the chamber around a string of soft flexible conduit to be installed in the well; filling the conduit with fluid; drawing the soft flexible conduit with the fluid therein

through the seal into the chamber by force applied to the conduit in the chamber between the seal and the well bore; and directing the soft flexible conduit from the chamber into the bore of the well.



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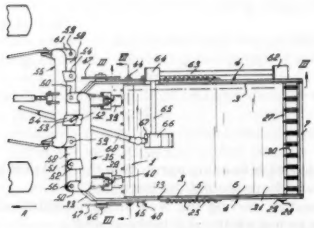
**3,920,077**
**PLOUGHS**
**Cornelius van der Lely, 7, Bruschenrain, Zug, Switzerland**
**Filed Sept. 10, 1973, Ser. No. 395,526**
**Claims priority, application Netherlands, Sept. 7, 1972, 7212155**
**Int. Cl.[2] A01B** *3/00*
**U.S. Cl. 172—33** **11 Claims**



**1.** A plough movable over the ground comprising forward soil-loosening means and a plurality of freely rotatable spaced apart soil-elevating elements journalled on said plough and positioned immediately adjacent one another to the rear of said soil-loosening means with respect to the normal direction of travel of said plough, said elements extending transverse to the direction of travel and having corresponding axes of rotation located to the rear and successively above said soil-loosening means, a soil-crumbling member on said plough located to the rear of said elevating elements and the latter being positioned in echelon to receive loosened soil from said soil-loosening means and convey that soil upwardly and obliquely to the crumbling member during travel of the plough, said loosening means comprising a plurality of tines positioned in side-by-side relationship and each tine extending generally in the direction of forward travel, leading end portions of said tines with respect to said direction being substantially horizontally disposed and means pivotally mounting said tines on a substantially horizontal pivot axis, said tines being movable between stop means against resilient means about said horizontal axis and the latter extending substantially perpendicular to the direction of travel.

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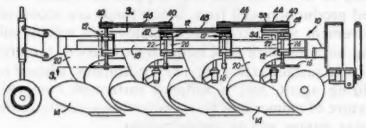
**3,920,078**
**TRASH CUTTING MEANS FOR PLOWS**
**Norman E. Schaeffer, 9124 W. 72nd St., Shawnee Mission, Kans. 66204**
**Continuation of Ser. No. 883,492, Dec. 9, 1969, abandoned. This application Dec. 13, 1971, Ser. No. 207,692**
**Int. Cl. A01b** *33/00*
**U.S. Cl. 172—39** **2 Claims**



**1.** In a multi-bottom, mobile, ground-plowing assembly having a normal direction of forward travel, frame structure spaced above ground level, a plurality of downwardly extending arms mounted on and depending from said frame structure in spaced relationship to each other, and a corresponding plurality of ground-engaging plow members each mounted on a corresponding arm adjacent the lower extremity of the latter and in downwardly spaced relationship to said frame structure, the improvement of which comprises power driven means for cutting away trash otherwise tending to accumulate above ground level on the forward extremities of said arms between said frame structure and the upper extremities of said plow members during travel of said assembly in said direction, said cutting means comprising:

a plurality of rotary cutter devices each having a plurality of elongate, substantially coplanar cutting blades;

means on said frame structure adjacent the upper extremity of each of said arms respectively for mounting a corresponding one of said plurality of cutter devices for rotation about a corresponding substantially vertical axis, with the path of travel of said blades of each of said cutter devices during rotation of the latter being disposed in a substantially horizontal and substantially planar, circular zone extending in front of the corresponding of said arms and into proximity with the latter at a level beneath said frame, above ground level, and above the level of the upper extremity of the corresponding plow member;

power means common to said cutter devices; and

drive means for operably coupling said power means with each of said cutter devices to rotate the latter and move said blades thereof in said respective zones of travel thereof to cut away and prevent accumulation of trash on said arms between said frame and the upper extremities of said plow members.

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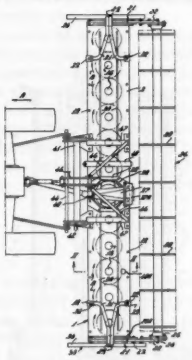
**3,920,079**
**SOIL CULTIVATING IMPLEMENTS OR ROTARY HARROWS**
**Cornelis van der Lely, 7 Bruschenrain, Zug, Switzerland**
**Filed Dec. 3, 1973, Ser. No. 421,436**
**Claims priority, application Netherlands, Feb. 4, 1972, 7216409; Dec. 20, 1972, 7217348**
**Int. Cl.[2] A01B** *33/06*
**U.S. Cl. 172—59** **4 Claims**

**1.** A rotary harrow comprising frame means, said frame means including a frame portion that supports side-by-side rotatable soil-working members, each of said soil-working members including a tine support and a tine at each end of said support, said soil-working members being mounted in a row that extends transverse to the normal direction of travel, said two tines and support of each soil-working member being rotatable about an upwardly extending shaft and means securing said support to the lower portion of said shaft, said two

tines and support being formed from a single piece of material, said support being provided with a hole located between said tines and the end of said shaft being entered in said hole and detachably held in said hole by connection means, each tine having a soil-working portion that is substantially straight throughout its length, and the upper portion of that soil-working portion having a substantially circular cross-section which tapers progressively in a downward direction to a polygonal cross-section towards the tip of the tine, said cross-section being substantially rectangular with corners, said cross-section adjacent said tip forming diagonals of different lengths between pairs of opposite corners.



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**3,920,080**

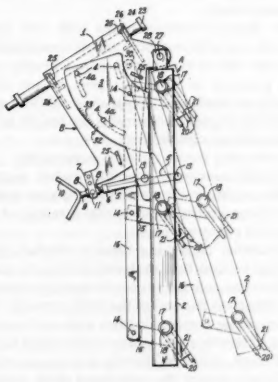
## CHANGEABLE CHASSIS OF PLOUGH

**Constantinos Nicolaou Vassiliou, 36 Kassandrou St., Thessaloniki, Greece**

**Continuation of Ser. No. 164,267, July 20, 1971, abandoned. This application Aug. 16, 1973, Ser. No. 388,855**

**Int. Cl.[2] A01B** *59/043, 65/00*

**U.S. Cl. 172—447** **9 Claims**



1. An apparatus for adjustably mounting a plurality of earth-working tools comprising:

a. a body portion;

b. said body portion including a plurality of tool mounting means, each of which is pivotable about a vertical axis;

c. each tool mounting means having an arm extending therefrom, each arm having a joint means disposed at a point thereon which is spaced from the vertical axis of the associated tool mounting means;

d. means connecting each of said joint means, said connecting means being movable in generally parallel relationship with respect to said body portion;

e. a support means adapted for attachment to a tractor, said connecting means being coupled with said support means;

f. a pivot means between said support means and said body portion for swingably connecting said body portion to said support means;

g. means, connected between said support means and said main body portion, for swingably moving said main body portion relative to said support means;

h. whereby, upon swinging movement of said body portion, the effective width of tool sweep is varied and each of said tool mounting means is pivoted to maintain the tool mounting means at the same working angle regardless of the disposition of the body portion.

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**3,920,081**

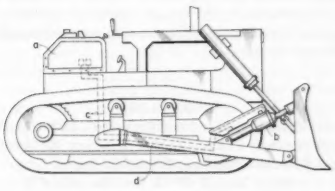
## CONDUIT ARRANGEMENT FOR TILT CYLINDER OF BULLDOZER

**Akio Terai; Eiji Kawamura, and Hisashi Fukumoto, all of Hirakata, Japan, assignors to Kabushiki Kaisha Komatsu Seisakusho, Tokyo, Japan**

**Filed June 25, 1974, Ser. No. 482,853**

**Int. Cl.[2] E02F** *3/76*

**U.S. Cl. 172—801** **3 Claims**



1. A conduit arrangement for a tilt cylinder of a bulldozer comprising:

a. a trunnion mounted on the truck frame and arm frame of said bulldozer, said truck frame having a hole therethrough and said trunnion having a hole through the center thereof, wherein said hole in said truck frame and said hole in said trunnion are aligned;

b. first conduit means coupled to said tilt cylinder and passing through said holes in said trunnion and truck frame, wherein the portion of said first conduit means located immediately before it enters said holes is exposed;

c. second conduit means coupled to a hydraulic fluid supply tank;

d. first coupling means coupling said first and second conduit means; and

e. a unitary cover plate means mounted on said arm frame for covering said exposed portion of said first conduit means and said trunnion.

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**3,920,082**

## POWER TOOL WITH TORQUE SENSING CONTROL MEANS

**Edmund C. Dudek, St. Charles, Ill., assignor to Thor Power Tool Company, Aurora, Ill.**

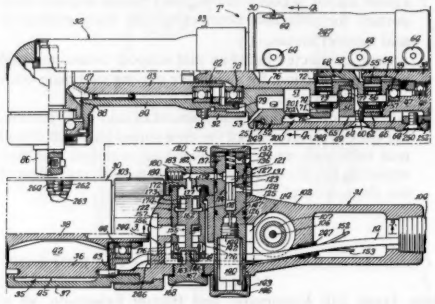
**Filed May 14, 1973, Ser. No. 359,640**

**Int. Cl.[2] B25B** *23/14*

**U.S. Cl. 173—12** **6 Claims**

1. In a power tool including torque output means and a tool body having a motor therein and drive means connecting said motor with said torque output means, the improvement of torque sensing control means for automatically shutting off

said motor when the torque output of said torque output means reaches a predetermined value, said control means including transducer means in said tool body and subjected to a reaction torque from a substnatially stationary member of said drive means, said transducer means including an axially extending sleeve having one end fixed in said body, ring gear means carried at the other end of the sleeve, sensing means on



said sleeve and spaced axially of said ring gear means for sensing torsional load on said ring gear means, said drive means including reduction gearing including said ring gear means, said reduction gearing being unsupported by said tranducer means, said transducer means providing a control signal proportional to the torque output of said torque output means, and means responsive to said control signal for shutting off said motor.

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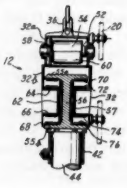
**3,920,083**

## PILE DRIVING AND DRAWING APPARATUS

**Hiroomi Makita, Tokyo, Japan, assignor to Toyoda Kikai Kogyo Kabushiki Kaisha, Shizuoka, Japan**

**Filed May 3, 1974, Ser. No. 466,675**
**Int. Cl.[2] E02D** *7/06*
**U.S. Cl. 173—49** **14 Claims**



**1.** A pile driving and drawing apparatus comprising

a guide member consisting of a rod provided with a flange adapted to be placed on the head of a pile to be driven into the ground;

a weight assembly adapted to effect the relative movement with respect to said guide member, said assembly including a casing provided with a first portion for receiving the rod of said guide member in sliding engagement therewith and a second portion positioned below said first portion and adapted to impinge on said flange, and said assembly further including an excitor provided within said casing; and

a resilient body placed between said flange and second portion of said casing,

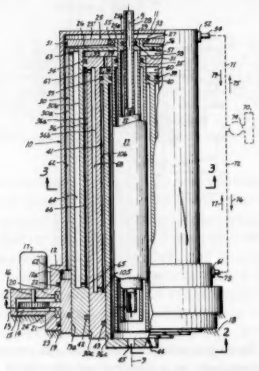
the natural frequency of said excitor being so arranged as to coincide with the free frequency of said weight assembly which is dependent on said resilient body.

**3,920,084**

## EXTENDABLE AND RETRACTIBLE MATERIAL DELIVERY DEVICES

**Wayne B. Russell, Jr., 3895 Lugo Ave., Lynwood, Calif. 90262**

**Continuation-in-part of Ser. No. 418,073, Nov. 21, 1973, which is a continuation of Ser. No. 177,592, Sept. 3, 1971, abandoned. This application Sept. 5, 1974, Ser. No. 503,287**
**Int. Cl.[2] B25D** *17/14*; **E21C** *7/00*
**U.S. Cl. 173—79** **15 Claims**



**1.** In an extendible and contractible shaft having a plurality of shaft members having a common longitudinal axis and each, except the outermost shaft member, being telescoped within the one next adjacent,

each telescoped shaft member having a piston slidably sealed to the inner wall of the next adjacent outer shaft member to form a series of tendem-arranged sealed pistons,

closure means at the end of said outermost shaft member which the pistons approach when the shaft is contracting, fluid passageways between adjacent shaft members,

means providing fluid communication between adjacent fluid passageways,

a first port means communicating with one side of said piston seals and a second port means communicating with the opposite side of said piston seals, whereby application of fluid pressure at said first port means extends the length of said shaft and application of fluid pressure at said second port means contracts the length of said shaft, the improvement comprising:

material conveying conduit means comprising

a first material conveying tubular conduit section within said shaft and fixed relative to said outermost shaft member and communicating with the exterior of said shaft through said closure means,

a second material conveying tubular conduit section slidably sealed to said first material conveying conduit section so that the conduit means is thereby extendible; and opening means at the end of the shaft opposite the closure means providing communication with the conduit means.

**11.** In an extendible and contractible shaft having a plurality of shaft members having a common longitudinal axis and each, except the outermost shaft member, being telescoped within the one next adjacent,

each telescoped shaft member having a piston slidably sealed to the inner wall of the next adjacent outer shaft member to form a series of tandem-arranged sealed pistons,

closure means at the end of said outermost shaft member which the pistons approach when the shaft is contracting, fluid passageways between adjacent shaft members,

means providing fluid communication between adjacent fluid passageways,

a first port means communicating with one side of said piston seals and a second port means communicating with the opposite side of said piston seals, whereby application of fluid pressure at said first port means extends the length of said shaft and application of fluid pressure at said second port means contracts the length of said shaft, the improvement comprising:

first material conveying conduit means comprising

a first material conveying tubular conduit section positioned to provide communication from the exterior of said shaft through said closure means to a position within said shaft, and fixed relative to said outermost shaft member,

a second material conveying tubular conduit section movable longitudinally within said first conduit section and attached at its end opposite said closure means to a shaft member other than the outermost shaft member.

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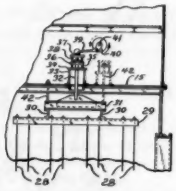
**3,920,085**

## SWING HAMMER RAPPING SYSTEM FOR ELECTROSTATIC PRECIPITATOR

**Bernard J. Bourke, White Plains, N.Y., assignor to Universal Oil Products Company, Des Plaines, Ill.**

**Filed Nov. 11, 1974, Ser. No. 522,672**
**Int. Cl.[2] B03C** *3/76*
**U.S. Cl. 173—99** **9 Claims**



1. A swing hammer rapping system for dislodging collected particles from the electrodes of an electrostatic precipitator that locates the hammers external of the gas chamber, which comprises in combination,

a. a plurality of free-fall swing hammer means positioned above the roof of a gas stream chamber and above the tops of a multiplicity of vertically suspended electrodes which are, in turn, positioned in a spaced relationship across the width of such chamber,

b. power-operated shaft means and pin connection means thereon for holding said hammer means,

c. spaced rod means extending upwardly from the upper portions of framing for the holding of such electrodes that are to be jarred and passing through the roof portion of the gas chamber without contact therewith of said precipitator,

d. strike pad means on each of said upwardly extending rods for receiving vertical blows from said swing hammer means, and

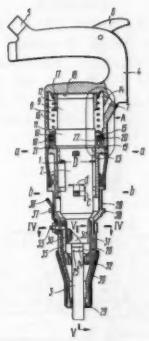
e. the positioning of said hammer and said shaft means with respect to said rod means from the electrode framing such that the free-fall of the swing hammers as they are rotated by the shaft means will effect periodic vertical blows on the pad means and the connecting electrodes.

**3,920,086**

## PNEUMATIC HAMMER

**Albert Adolfovich Goppen, ulitsa Narodnogo opolchenia, 22, korpus 3, kv. 95; Igor Vladimirovich Nikolaer, ulitsa Fadeeva, 5, kv. 37, both of Moscow; Lidia Mikhailovna Dronova, ulitsa Kalarash, 5, kv. 68, Ljubertsy Moskovskoi oblasti, and Anatoly Ivanovich Lednikov, Korovinskoe shosse, 9, korpus 2, kv. 51, Moscow, all of U.S.S.R.**

**Filed May 23, 1974, Ser. No. 472,864**
**Int. Cl.[2] B25D** *9/04*
**U.S. Cl. 173—134** **9 Claims**



1. A pneumatic hammer comprising: a housing having an inner surface; a barrel mounted in said housing and axially movable relative thereto; said barrel having a forward end and an outer surface; an air-distribution device and an impact mechanism accommodated in said barrel to ensure reciprocations of a hammer piston under the action of compressed air, with the hammer piston imparting blows to a shank of a working tool received in the forward end of said barrel; the outer surface of said barrel and the inner surface of said housing defining an annular space therebetween; a handle having trigger means for controlling the supply of compressed air into said barrel, the handle being rigidly secured to said housing; a first portion of said barrel having a smaller diameter adjacent to said handle; a second portion of said barrel having a greater diameter; a shoulder formed between said first and second portions of the barrel, an end wall of said shoulder facing said handle; sealing members comprising bushings mounted on said first and second portions of said barrel; said bushings having outer peripheries and end faces, the end faces being in sealing engagement with the housing, annular spaces provided between the outer periphery of said bushings and the inner surface of said housing; a spring member mounted between said bushings; and guide members between said housing and said barrel, whereby said sealing members are relieved from the radial load, so that their wear is reduced, as well as compressed air leakage.

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**3,920,087**

## ROTARY DRIVE AND JOINT BREAKOUT MECHANISM

**Robert W. Hisey, Richardson, and Larry E. Halwas, Garland, both of Tex., assignors to Gardner-Denver Company, Dallas, Tex.**

**Division of Ser. No. 379,664, July 16, 1973, Pat. No. 3,874,196. This application Jan. 22, 1975, Ser. No. 542,983**
**Int. Cl.[2] E21B** *3/00*
**U.S. Cl. 173—164** **4 Claims**

1. In a rotary drive arrangement for rotating a drill stem on an earth drilling rig:

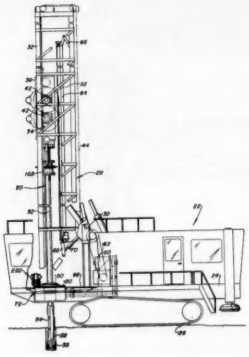
a rotary table having a housing supporting a rotatable table member;

a bushing removably fitted on said table member to be rotatably driven by said table member and including an

opening in which said drill stem is disposed for longitudinal movement with respect to said table member;

said drill stem comprising at least one elongated drill pipe section having recess means formed in the outer wall surface thereof, said recess means including drive surface means extending longitudinally over a major portion of said drill pipe section;

means disposed on said table member for engagement with said drive surface means for rotating said drill pipe section in response to the rotation of said table member;



said drill stem includes a rotary bit threadedly connected to the lower end of said drill stem;

said drilling rig including a fixture removably mountable on said table member for engagement with said bit to rotate said bit in response to the rotation of said table member; and,

said drilling rig further including a power operated holding wrench for engagement with said drill stem to hold said drill stem nonrotatable while said bit is rotated by said fixture to release the threaded connection between said bit and said drill stem.

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**3,920,088**

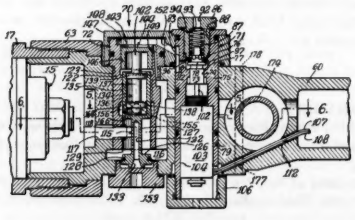
**POWER TOOL WITH CONTINUOUS AND PULSATING TORQUE OUTPUT CYCLE**

**Edmund C. Dudek, St. Charles, Ill., assignor to Thor Power Tool Company, Aurora, Ill.**

**Filed Nov. 23, 1973, Ser. No. 418,779**

**Int. Cl.[2] B23B** *45/04*; **B23Q** *5/08*

**U.S. Cl. 173—169** **8 Claims**



1. In a pneumatic tool or the like, including a tool body having a pneumatic motor therein for transmitting torque to a torque output member, an elongated handle connected to one end of said body, and an air supply passage extending through said handle, one end of said air supply passage being connected to said motor and the opposite end of said air supply passage being adapted to be connected to a source of air under pressure, the improvement of a control valve assembly for controlling the flow of air to said motor, said control valve assembly being adapted to be connected to and controlled by an associated control system, said control valve assembly comprising a control valve member mounted in a bore in said handle and movable between a first position permitting air under pressure to flow through said air supply passage to said motor and a second position preventing air under pressure from flowing through said air supply passage to said motor, said handle also having a chamber therein at one end of said control valve member for receiving air under pressure from said air supply passage, a piston slidably mounted in another portion of said bore in said handle and exposed to the pressure in said chamber, and a lightweight spacer member interconnecting said piston and said control valve member, said lightweight spacer member reducing the weight and response time of said piston-control valve member combination.

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**3,920,089**

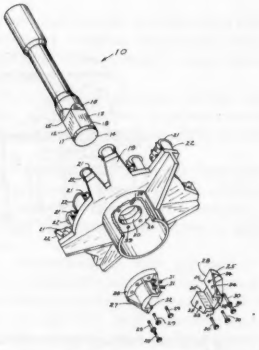
**REMOVABLE STEM FOR RAISE BIT**

**Howard Earl Mitchell, Duncanville, Tex., assignor to Dresser Industries, Inc., Dallas, Tex.**

**Filed Mar. 7, 1974, Ser. No. 449,179**

**Int. Cl.[2] E21C** *23/00*

**U.S. Cl. 175—53** **5 Claims**



1. A bit for enlarging a pilot hole into a larger diameter hole by distintegrating earth formations surrounding the pilot hole, comprising:

a main bit body including a multiplicity of cutters for contacting and disintegrating earth formations surrounding the pilot hole;

a central opening in said main bit body;

a drive stem positioned in said central opening with a portion of said drive stem extending beyond said central opening;

recess means on the portion of said drive stem extending beyond said central opening that provide said portion with a non-circular cross section;

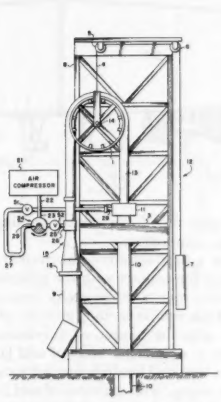
a retaining element positioned in said recess means, said retaining element being a two-piece collar adapted to be bolted to said main bit body; and

means for attaching said retaining element to said main bit body.

## 3,920,090
## CONTROL METHOD AND APPARATUS FOR PRESSURE, VACUUM OR PRESSURE-VACUUM CIRCULATION IN DRILLING SYSTEM

**Robert W. McQueen, and Robert W. Ruhe, Jr., both of Houston, Tex., assignors to Dresser Industries, Inc., Dallas, Tex.**

**Filed Feb. 26, 1975, Ser. No. 553,415**
**Int. Cl.[2] E21B** *7/00;* **E21C** *7/02;* **E21B** *21/00*
**U.S. Cl. 175—60** **5 Claims**




**4.** A method of drilling a hole in earth formations, comprising:

rotating a string of drill pipe having a center longitudinal passage and a drill bit into said earth formation;

causing pressurized air to be introduced into the bottom of said drilled hole;

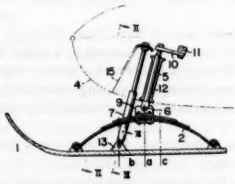
creating a vacuum in the said center longitudinal passage of said string of drill pipe; and

simultaneously increasing the amount of said pressurized air and decreasing the magnitude of said vacuum.

## 3,920,091
## SHOCK ABSORBING DEVICE FOR SKIS OF SNOW MOBILES

**Nobuyori Kuwano, Fukiage, and Takayoshi Tsuchiya, Kasugai, both of Japan, assignors to Showa Manufacturing Co., Ltd., Tokyo, Japan**

**Claims priority, application Japan, Feb. 26, 1973, 222138**
**Filed June 25, 1973, Ser. No. 373,376**
**Int. Cl.[2] B62M** *27/02*
**U.S. Cl. 180—5 R** **5 Claims**

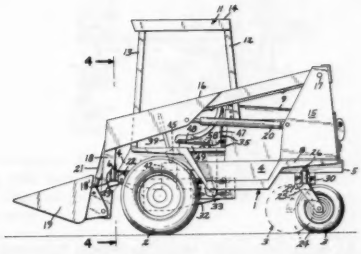


**1.** A snow mobile comprising a body having endless driving tracks at the rear thereof, and skis fitted on each side of the front part of said body; said skis being fitted to said body by (1) a suspension spring connected at substantially the center thereof to the lower end of spindle means, said spindle means being connected at the upper end thereof to said body through a steering arm and tie rod; and (2) oil pressure shock absorber means connected to said ski at its lower end by a universal joint substantially adjacent to said ski and pivotably connected at its upper end to said body, said spindle means and shock absorber means being constructed and arranged whereby the shock absorber is substantially perpendicular to said ski and substantially parallel to said spindle means when viewed from the side, and the distance between said spindle means and shock absorber is such as to provide a dampening force while substantially reducing or eliminating fluttering of said ski.

## 3,920,092
## UTILITY VEHICLE

**J. Craig Henderson; Thomas G. Teller, and T. Herbert Morrell, all of Owatonna, Minn., assignors to Owatonna Manufacturing Company, Inc., Owatonna, Minn.**

**Filed Dec. 9, 1974, Ser. No. 530,973**
**Int. Cl.[2] B62D** *11/04*
**U.S. Cl. 180—6.48** **7 Claims**



**1.** A utility vehicle comprising:

a. a frame elongated in the direction of movement of the vehicle;

b. a pair of laterally spaced drive wheels at one end of the frame;

c. a pair of laterally spaced casters;

d. means mounting the casters on the opposite end of the frame;

e. an engine mounted on the frame;

f. power transmission mechanism operated by the engine for imparting driving rotation to the drive wheels;

g. control means for the power transmission mechanism for controlling the direction and speed of rotation of the drive wheels individually and including an operating member and a control bar member extending upwardly from the operating member, said operating member comprising a shaft mounted in the frame for limited rotary steering movement on its own axis and for pivotal drive control movements on a generally horizontal axis extending transversely of said frame and between a generally vertical neutral position and drive position angularly displaced in opposite directions away from said neutral position;

h. means connecting the control bar member to said operating member in a selected one of a pair of positions angularly displaced in directions generally longitudinally of the frame;

i. an operator's seat;

j. means mounting said seat on the frame selectively at opposite sides of said control bar member longitudinally of said frame and facing in opposite directions longitudinally of the frame, so that an operator on said seat is disposed to face the control bar member in either selected position of said seat;

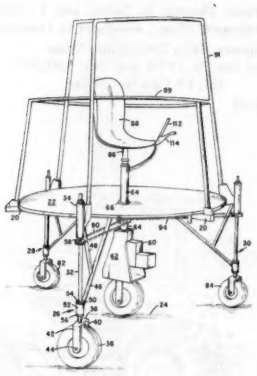
k. and means at opposite ends of said frame for attaching implements thereon.

3,920,093

## OMNIDIRECTIONALLY STEERABLE VEHICLE

Robert F. Moran, and Darryl W. Sanders, both of, c/o Mrs. L. C. Shelton, Rte. No. 23, Topside Road, Knoxville, Tenn. 37920

Continuation of Ser. No. 138,058, April 28, 1971, abandoned. This application Jan. 26, 1973, Ser. No. 327,248
Int. Cl. B62d 61/00; B62k 21/00
U.S. Cl. 180—21 6 Claims



1. An omnidirectionally steerable vehicle for travel over a generally horizontal supporting surface while carrying an operator thereon comprising in combination

motor means,

frame means,

a plurality of spaced apart wheel means supporting said frame above said surface,

means rotatably mounting each of said wheel means for rotation through 360° about an upright axis, at least one of said wheel means being drivingly connected to said motor means whereby said vehicle is propelled along said supporting surface upon turning of said driven wheel means by said motor means,

operator support means receiving said operator thereon,

means mounting said operator support means rotatably with respect to said frame means and defining an upright axis about which said operator support means, hence said operator, is rotatable 360° with respect to said frame means,

means connecting at least two of said wheel means one to another and to said means mounting said operator support means and restraining said connected wheel means against rotation about their axes when said means is inactivated and turning said connected wheel means in unison in the same direction and to the same angular extent when said means is activated, whereby said frame means is stabilized against rotation with respect to said supporting surface when said connected wheel means are rotated in unison about their respective axes,

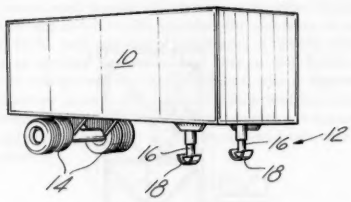
means mounted on said frame means and engageable by said operator for simultaneously rotating said operator support means with respect to said frame means and activating said means connecting said wheel means to one another whereby said operator support means and said connected wheel means are caused to rotate in unison in the same direction and to the same angular extent and said operator on said operator support means is oriented in the forward direction of movement of said vehicle at all times.

3,920,094

## LANDING GEAR FOOT

Hyle K. Claflin, Kent, Mich., assignor to Westran Corporation, Muskegon, Mich.

Filed Jan. 28, 1974, Ser. No. 437,507
Int. Cl.² B60S 9/02
U.S. Cl. 280—150.5 9 Claims




1. A landing gear foot for a vehicle landing gear having a landing gear leg, comprising:

a body having a substantially semi-circular curved shaped outer surface for contact with the ground; and

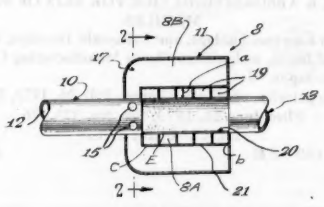
pivotal mounting means for pivotally connecting said body to the leg of the vehicle landing gear the pivotal axis being coincident with the center of curvature of said outer surface; and in which said body of said landing gear foot has an open top, said landing gear leg extending into said open top to engage with the sides of said landing gear foot upon pivotal movement thereof to limit pivoting of said foot to less than 90°.

3,920,095

## FREE FLOW SOUND ATTENUATING DEVICE AND METHOD OF USING

Raymond C. Clark, Lake Forest, Ill., assignor to Brunswick Corporation, Skokie, Ill.

Filed Feb. 1, 1974, Ser. No. 438,736
Int. Cl.² F01N 1/04
U.S. Cl. 181—42 38 Claims




1. A device for attenuating sound in a fluid flowing therefrom, the fluid having a known acoustical impedance measured in rayls, comprising a housing surrounding a conduit having an inlet and an outlet, the conduit having in series after the inlet:

first means for attenuating low frequency sound entering the device; and

second means for attenuating high frequency sound entering the device,

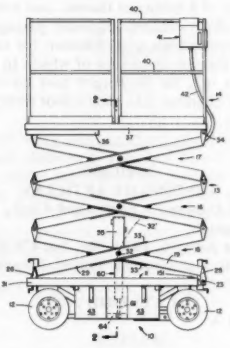
the second means having a foraminous duct in series with said conduit, the duct having a preselected acoustical resistance measured in rayls substantially the same value in rayls as the impedance of the flowing fluid, the first means attenuating the low frequency sound to a level sufficiently low to enable the foraminous duct to effectively function at its preselected acoustical resistance.

3,920,096

## VERTICAL HYDRAULIC RAM SYSTEM FOR SCISSORS ASSEMBLY SCAFFOLD

Robert E. Fisher, Larkspur, Calif., assignor to Upright, Inc., Berkeley, Calif.

Filed July 1, 1974, Ser. No. 484,812
Int. Cl.[2] E04G 1/22
U.S. Cl. 182—63 9 Claims



1. An elevating scaffold comprising:

a. a generally rectangular frame having an upper surface and lower central support members suspended a substantial distance below said upper surface,

b. a plurality of ground-engaging wheels mounted on said frame, the bottom surfaces of said wheels being a relatively small distance below said lower central support members,

c. an upwardly extensible and downwardly contractable scissors assembly mounted on the upper surface of said frame, said scissors assembly comprising a plurality of pivotally interconnected ascending scissors stages, the lowermost of which is connected to said frame, each stage comprising laterally spaced-apart pairs of rigid elongated scissors elements pivotally connected together at their midpoints,

d. a work platform supported in and connected to the uppermost scissors stage,

e. a first yoke connected to the midpoint of one of said pairs of scissors elements of said lowermost scissors stage and a second yoke connected to the midpoint of the other of said pairs of scissors elements of said lowermost scissors stage, said yokes extending upwardly substantially to the underneath of said platform when said scissors assembly has been fully contracted,

f. a pair of laterally spaced-apart, hydraulically extensible rams, one for each yoke, the lower ends of said rams being pivotally secured to said lower central support members and the upper ends of the rams being secured to the upper ends of said yokes,

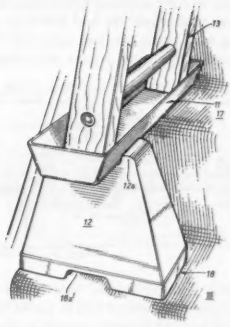
g. means for forcing hydraulic fluid simultaneously into and for relieving hydraulic fluid simultaneously from said rams.

3,920,097

## STAIRWAY PLATFORM

Raymond Ian Brebner, 156, Grove Park. Knutsford, Cheshire, England

Filed Jan. 2, 1974, Ser. No. 429,746
Claims priority, application United Kingdom, Jan. 31, 1973, 4965/73; Mar. 2, 1973, 10199/73
Int. Cl.[2] E04C 7/44
U.S. Cl. 182—107 9 Claims



1. A support structure for supporting the foot of a ladder having stile bars and rungs in an upright operative position upon a step surface forming an upper step and a lower step, comprising:

a. an elongated support member spanning the width of a ladder foot to be supported,

b. a pedestal member having top and bottom portions, said bottom portion being adapted to rest upon the lower step,

c. said top portion comprising seat means removably engaging one end portion of said elongaged support member to support said elongated support member in a substantially horizontal operative position while the other end of said support member rests upon the upper step,

d. said seat means further comprising wall means restraining horizontal movement of said elongated support member laterally of said support member,

e. said elongated support member having wall means positively and removably engaging and restraining the stile bars of the ladder foot against horizontal movement in operative position.

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3,920,098

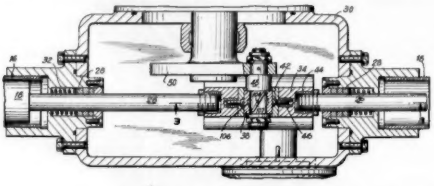
## PRESSURIZED LUBRICATING SYSTEM FOR A RECIPROCATING COMPRESSOR DRIVE

Walter Schroeder, 1014 S. Jackson, Green Bay, Wis. 54301

Continuation-in-part of Ser. No. 119,478, March 1, 1971, Pat. No. 3,779,672. This application Nov. 26, 1973, Ser. No. 419,148
Claims priority, application Germany, Mar. 3, 1970, 2009770
Int. Cl.[2] F16N 1/00
U.S. Cl. 184—5 9 Claims

1. For use with horizontally arranged opposed compressor pistons, a pair of coaxial horizontal piston rods, crosshead means situated between and fixed to said piston rods, said crosshead means being formed with a vertically extending slot and having opposed upper and lower ends respectively formed with bores extending therethrough parallel to said piston rods, a pair of bearing means respectively situated in said bores and fixed to said crosshead means, a pair of guide bars extending parallel to said piston rods through said bearing means, said bearing means having sliding engagement with respect to said guide bars, housing means carrying said guide bars and hous-

ing said guide bars and crosshead means in the interior of said housing means, a slide block situated in said slot of said crosshead means for slidable movement vertically along said slot, rotary crank means carried by said housing means and having a horizontal axis of rotation which is perpendicular to the common axis of said piston rods, said rotary crank means including a crank pin displaced by a predetermined radial distance from said axis of rotation of said rotary crank means and operatively connected with said slide block for reciprocating the latter vertically in said slot of said crosshead means while displacing said crosshead mean back and forth along said guide bars, and pressurized lubricating means operatively connected with said crank pin and said pair of bearing means for lubricating said crank pin and said pair of bearing means, said pressurized lubricating means including a pump means



carried by said housing means and communicating with a lower interior portion thereof where an oil bath is located, an oil ring carried by said housing means in the interior thereof and surrounding said rotary crank means, said oil ring communicating with said pump means to be fed with pressurized oil thereby and said oil ring having an interior groove provided by said pump means with a supply of oil, said rotary crank means being formed with an internal bore communicating with said groove of said oil ring and receiving pressurized oil therefrom, and said crank pin being formed with internal bores communicating with said bore of said rotary crank means and with an inner surfacae of said slide block which surrounds said crank pin so that the presssurized oil is delivered from said rotary crank means along the interior of said crank pin to the inner surface of said slide block which surrounds said crank pin.

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**3,920,099**

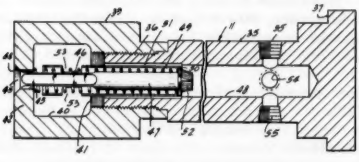
## APPARATUS FOR LUBRICATING A DIE STRUCTURE EMPLOYED IN DIE CASTING OPERATIONS

**William J. Pondelicek, Arlington Heights;, and Vernon F. Schmidt, Chicago, both of Ill., assignors to Heich Die Casting Corporation, Chicago, Ill.**

**Division of Ser. No. 213,867, Dec. 30, 1971, Pat. No. 3,779,305. This application Sept. 24, 1973, Ser. No. 400,327**

**Int. Cl.[2] F01M** *1/08*

**U.S. Cl. 184—55 A** **3 Claims**



**2.** A ram plunger for use in a die casting apparatus for providing lubrication of a die cavity associated therewith, comprising a hollow cylindrical shank member and an axially aligned hollow cylindrical head member forming the inner end of said plunger, said head member having internal threads thereon engageable with external threads on the adjacent end of said shank member for detachably securing the two in rigid relation, which plunger, in use, is to be disposed for reciprocable movement in the shot sleeve of such an apparatus, said head member having a chamber therein and having an axially disposed port in the inner end face thereof providing communication between said chamber and the inner end face of said head member, normally closed valve means, carried by said plunger, for normally closing said chamber with respect to said inner end of said head member, said valve means comprising a valve member normally closing said port and movable outwardly to open the same, said valve member having an axially extending valve stem disposed in said plunger, and a compression spring encircling said valve stem having one end bearing on said head member and the other end seated on abutment-forming means carried by said valve stem operative to normally retain said valve member in closed position, said shank member having a passageway therein, opening on a portion thereof which, in use, remains externally of such a shot sleeve, which passageway communicates with said chamber for the entry of a lubricant therein, and said shank member having another, similarly disposed passageway therein, which communicates with said chamber, for supplying a gas under pressure thereto, by means of which, in use, lubricant in said chamber may be discharged past the valve member exteriorly of the chamber into such a shot sleeve and an associated die cavity.

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**3,920,100**

## VENDING OF ARTICLES

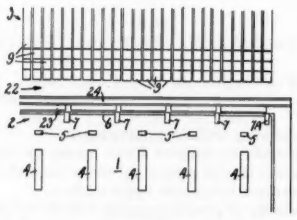
**Lawrence Cyril Dunphy, 9 Scottswood Close, Bushey, Hertfordshire, England**

**Filed June 10, 1974, Ser. No. 478,057**

**Claims priority, application United Kingdom, June 22, 1973, 29728/73**

**Int. Cl.[2] E04H** *3/02*

**U.S. Cl. 186—1 A** **6 Claims**



**1.** A method of vending in which dummy articles corresponding to those offered for sale are on show in a display area along with tokens carrying information relating to the article including the price, a customer in the display area selects at least one token corresponding to an article which he wishes to purchase and gives the token to an assistant who selects the corresponding article from one of a multiplicity of conveyors transporting the articles offered for sale from a storage area inaccessible to the customer and places it along with the token in a receptacle, the interior of which is also inaccessible to the customer, the receptacle containing the article and token is displaced along a guide path to a pay area where the information on the token is used to determine the amount which the customer is charged, the customer pays for the article and receives the article from the receptacle.

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**3,920,101**

## SAFETY TOE GUARD

**Lawrence I. Richards, Elk Grove Village, Ill., assignor to Autoquip Corporation, Chicago, Ill.**

**Filed Dec. 15, 1971, Ser. No. 208,105**

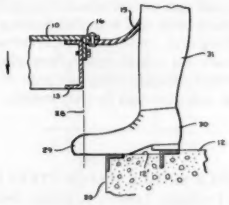
**Int. Cl.[2] B66B** *5/00*

**U.S. Cl. 187—98** **5 Claims**

**1.** A protective device for use with a platofrm or the like which is raised vertically, and subsequently lowered, with respect to a stationary area adjacent said platform and on

which a person may be standing, said protective device comprising:

a flexible band affixed to the side of said platform which is adjacent said area and projecting a significant distance over said area, said band being sufficiently rigid to normally maintain a position outwardly from said platform and sufficiently flexible to readily bend from said outwardly extending position upon encountering an obstacle,



said band being positioned on said platform so that, if, when said platform is raised, a person is standing sufficiently close to the edge of the platform such that his foot would be trapped under the platform when it descends, the distal edge of the band will brush his leg and thereby warn him to move his foot, while if he is standing only so close that his foot is positioned under the band, but not the platform, the band will bend upwardly upon encountering the foot thereby not causing any injury to the foot.

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**3,920,102**

## DISC BRAKE ACTUATING AND ADJUSTING MECHANISM

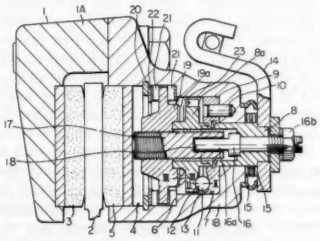
**Hiroshi Ito, Yokohama, Japan, assignor to Tokico, Ltd., Kanagawa, Japan**

**Filed Jan. 10, 1974, Ser. No. 432,163**

**Claims priority, application Japan, Jan. 19, 1973, 48-8389; Mar. 16, 1973, 48-32355**

**Int. Cl.² F16D** *55/224, 65/56*

**U.S. Cl. 188—71.9** **2 Claims**



**1.** A disc brake comprising a housing having an axially stepped bore for receiving an input shaft, a bolt and a nut, said input shaft receiving an input force as a torque around the longitudinal axis thereof and moving rotatinally and axially by means disposed between said housing said input shaft for converting a portion of the torque into an axial thrust, said bolt having one end axially slidably engaged with the input shaft and the other end abutting a friction pad, said nut having screw-threads engaging said bolt and receiving said axial thrust from the input shaft and when a clamping force between the input shaft and the nut exceeds a predetermined value, rotating with said input shaft, and a ratchet mechanism being disposed between said input shaft and the nut for unidirectionally rotating the nut with the input shaft, characterized in that said bolt and said input shaft are connected by a member, one end of which has parallel opposing axially extending surfaces for slidably engaging an axial slot formed in said bolt, and the other end extending axially through a bore formed in said input shaft and being releasably secured thereto by means of a nut engaging said member.

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**3,920,103**

## AUTOMATIC GAP ADJUSTER FOR A DISC BRAKE UNIT

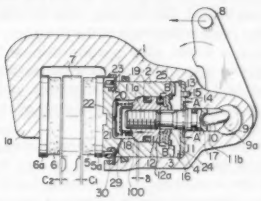
**Tetsuo Haraikawa, Funabashi, Japan, assignor to Tokico Ltd., Kawasaki, Japan**

**Filed Feb. 11, 1974, Ser. No. 441,521**

**Claims priority, application Japan, Feb. 9, 1973, 48-16263**

**Int. Cl.² F16D** *55/224*

**U.S. Cl. 188—71.9** **1 Claim**



**1.** In a disc brake unit for a vehicle wheel having a brake disc secured thereto, a caliper adapted to straddle at least a portion of the periphery of said disc and having a cylinder formed in one leg thereof, a hollow piston slidably and sealingly mounted in said cylinder, said piston having a closed end for operative engagement with a friction member, a gap adjuster bolt non-rotatably and axially slidably extending through said leg and into said hollow piston along the central axis of said piston, a nut disposed in threaded engagement with the end of said bolt within said piston and in fluid tight sliding engagement with the inner surface of said hollow piston to define an air chamber within said piston, said nut and the inner surface of said hollow piston being provided with complementary axially spaced beveled coupling surfaces within said air chamber and spring means disposed in said chamber for normally biasing said surfaces axially apart, and, passage means communicating said air chamber with the external atmosphere.

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**3,920,104**

## PARTIAL LINING DISC BRAKE

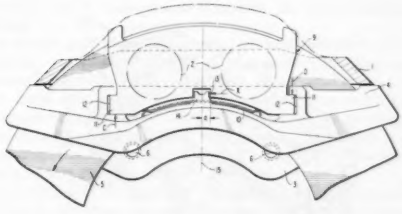
**Friedrich Hoffmann, Stuttgart, Germany, assignor to Daimler-Benz Aktiengesellschaft, Stuttgart, Germany**

**Filed Nov. 14, 1973, Ser. No. 415,528**

**Claims priority, application Germany, Nov. 14, 1972, 2255678**

**Int. Cl.² F16D** *65/02*

**U.S. Cl. 188—73.3** **20 Claims**



**1.** A partial lining disc brake comprising:

a brake disc means,

brake carrier means including a first pair of spaced leg portions extending transversely of the axis of rotation of

said brake disc means on respective sides thereof and a second pair of leg portions extending substantially parallel to the axis of rotation of said brake disc means and connecting the respective ends of said first pair of leg portions,

substantially C-shaped side guide rails provided on said brake carrier means on each side of said brake disc means at the inlet and outlet sides of said brake carrier means with respect to the direction of rotation of said brake disc means, said guide rails opening toward each other and extending in the direction of the axis of rotation of the brake disc means,

brake pad means disposed on each side of said brake disc means, each of said brake pad means including brake lining means and backing plate means for supporting said brake lining means, said backing plate means including an upper edge portion disposed at the periphery of the brake disc means, a lower edge portion disposed radially inwardly of said upper edge portion in the direction of the axis of rotation of said brake disc means, and lateral edge portions connecting the respective ends of said upper and lower edge portions,

horizontally extending side projection means provided on each lateral edge portion of each of said backing plate means at the lower edge portion thereof, said side projection means forming a minor portion of said backing plate means, each of said horizontally extending side projection means being disposed in a respective side guide rail so as to be axially displaceably guided therein,

intermediate projection means provided on said brake carrier means at the lower edge portion of said backing plate means, said intermediate projection means having intermediate guide support surface means disposed at an axial center plane of the brake which extends vertically through the axis of rotation of the brake disc means, said guide support surface means including first and second vertically extending support surfaces disposed on respective sides of the axial center plane of the brake and spaced therefrom by a predetermined distance, and

intermediate guide aperture means provided on each of said backing plate means along the lower edge thereof between said horizontally extending side projection means, said intermediate guide aperture means including intermediate guide counter support surfaces which interengage said first and second vertically extending support surfaces of said intermediate guide support surface means.

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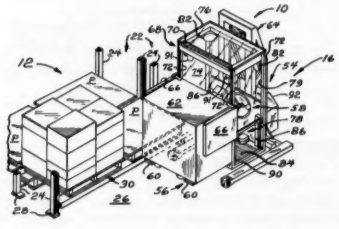
**3,920,105**

## ELECTRICAL POWER SUPPLY ARRANGEMENT FOR A GUIDED STOCK SELECTOR TRUCK

**Henry C. Fernstrom, Northbrook, Ill., assignor to Barrett Electronics Corporation, Northbrook, Ill.**

**Filed Feb. 6, 1974, Ser. No. 440,255**
**Int. Cl.[2] B60M** *1/00*
**U.S. Cl. 191—22 R** **21 Claims**



1. In a stock selector truck adapted for use in retrieving temperature sensitive materials from a cold storage area comprising, in combination, a vertically movable operator platform, load carrying means movable conjointly with said platform, lift means for enabling vertical movement of both said load carrying means and said platform, a work area on said platform having a first wall, an insulated storage cart removably carried by said load carrying means and defining a portion of a second wall for said work area, said storage cart having an opening which is accessible to an operator of said selector truck from said work area, thereby permitting the operator to conveniently store the selected temperature sensitive material in said cart as said selector truck moves adjacent storage racks which store said material, heating means located within said working area, and an electrical contactor means on said selector truck for automatically engaging an electrical power source which extends along the path of travel for said selector truck to energize said heating means.

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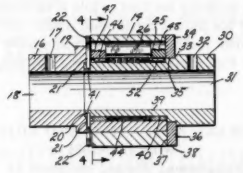
**3,920,106**

## REVERSIBLE SINGLE REVOLUTION CLUTCH

**Jules Nisenson, Trafalger Towers, S. Ocean Drive, Hollywood, Fla. 33020**

**Filed Nov. 5, 1973, Ser. No. 413,056**
**Int. Cl. F16d** *13/04, 11/06*
**U.S. Cl. 192—33 C** **1 Claim**



1. A single revolution clutch of type employed for transmitting motion through uniform angular increments comprising: a motion input hub element, a motion output hub element, an interconnecting clutch element, and an actuating sleeve element; said input hub element including a hollow cylindrical sleeve member having a cut out segment therein defining a pair of opposed parallel edges; said output element including a second sleeve positioned within said first sleeve; said clutch element including a contractile coil spring surrounding said second sleeve and having first and second oppositely disposed terminals, first and second actuating rings each having a radially-extending projecting thereon engaged with said first and second terminals of said spring, said projections being positioned between said pair of opposed parallel edges, whereby rotational motion in either direction imparted to said input hub element will be transmitted through one of said projections to result in the tightening of the convolutions of said coil spring upon said second sleeve, and the transmission of motion to said output hub element; said actuating sleeve element surrounding said coil spring and having inner and outer generally cylindrical surfaces, said outer surface having a direction-oriented notch for selective engagement by a pivotally mounted lug to prevent rotation in a given direction, said inner surface having an axially arranged groove and a radially inwardly directed transversely extending rib selectively contacting either of said projections to result in opening of the convolutions of said spring to interrupt transmission of motion between said input and output hubs upon the prevention of rotation of said actuating sleeve element, and the continued rotation of saiid input hub element; said sleeve element being selectively repositionable, end for end, upon said spring to position said notch for operation in either of two opposite rotational directions.

## 3,920,107
## SELF-ALIGNING CLUTCH RELEASE BEARING ARRANGEMENT

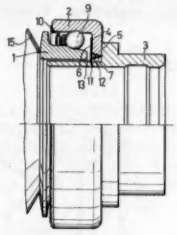
**Bernhard Limbacher, Niederwerrn, Germany, assignor to Fichtel & Sachs AG, Schweinfurt am Main, Germany**

**Filed July 31, 1974, Ser. No. 493,272**

**Claims priority, application Germany, Aug. 16, 1973, 7329767**

**Int. Cl.[2] F16D** *23/14, 27/00*

**U.S. Cl. 192—98** **6 Claims**



**1.** A clutch release bearing arrangement comprising:

a. a rotating inner ring;

b. a stationary outer ring having a radially inwardly extending flange,

1. the rings having a common axis;

c. an axially slidable sleeve,

1. the outer ring flange being guided on the sleeve with radial play;

d. a radially extending retaining ring;

e. a radially extending surface transmitting axial moving force from the slidable sleeve,

1. the surface being axially spaced from the retaining ring, and

2. the outer ring flange being arranged between the retaining ring and the force transmitting surface; and

f. resilient centering means integral with said retaining ring and arranged between the outer ring flange and the slidable sleeve,

1. said resilient centering means including a plurality of spring tongues extending substantially axially from the retaining ring towards the force transmitting surface,

2. the outer ring flange having an inner surface radially spaced from the slidable sleeve and the spring tongues resiliently engaging the inner surface of the outer ring flange in a radial direction.

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## 3,920,108
## FRICTION DISC MEMBER FOR BRAKE OR CLUTCH

**William E. Ely, Troy, Ohio, assignor to The B. F. Goodrich Company, Akron, Ohio**

**Filed Aug. 22, 1974, Ser. No. 499,506**

**Int. Cl.[2] F16D** *13/64, 69/04*

**U.S. Cl. 192—107 R** **3 Claims**

**1.** A friction member for a brake or clutch comprising an annular rigid disc member, said disc member having two opposite faces, a plurality of friction lining segments positioned at circumferentially spaced-apart positions on both said faces of said disc member with the friction lining segments on one of said faces being in alignment with the friction lining segments on the other of said faces, each of said lining segments including a bottom plate, peripheral side flanges and a body of friction lining material contained by said bottom plate and side flanges with a friction face extending continuously between said peripheral side flanges, an opening in said disc member under each of said friction lining segments, said bottom plate of each of said segments having a projection extending into said opening, said projection of a first segment on one face of the disc member being welded to said projection of a second segment on the opposite face of said disc member for clamping said bottom plate of each of said segments to a respective face on said disc member.

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## 3,920,109
## GEAR SHIFT WITH POSITIVE LOCK MEANS

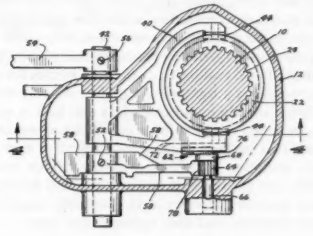
**David F. Thomas, West St. Paul, and William L. Kafka, Roseville, both of Minn., assignors to Waterous Company, South St. Paul, Minn.**

**Filed Oct. 12, 1973, Ser. No. 405,938**

*Disclosure was also published under Trial Voluntary Protest Program on Jan. 28, 1975.*

**Int. Cl.[2] F16d** *13/60*

**U.S. Cl. 192—114** **6 Claims**



**1.** In a power transmission train including a gear case, a drive gear rotatably mounted in said gear case, at least one driven gear rotatably mounted in concentric, end-to-end relation to a first end of the drive gear, a shift collar splined to the drive gear to be rotatable with it, the shift collar being slidable longitudinally of the drive gear to driveably encompass a portion of the driven gear, said shift collar being provided with an outer race, a shift fork, means on said shift fork to ride in said shift collar race, a shift shaft mounted in said gear case in spaced relation to the axis of said drive gear and said driven gear and having an axis perpendicular to a plane including the axis of said drive gear, said shift fork being pivotally supported on said shift shaft to move said shift collar between a position where it is in engagement with said driven gear and a position where it is out of engagement therewith, the improvement including:

A. a sector gear pivotally mounted on said shift shaft and having a rack-like section of gear teeth extending in direction outwardly from said shift shaft;

B. a crank arm assembly including a pinion gear pivotally mounted on said gear case in position to be in meshing relation to said sector gear teeth, and an oppositely extending stud, having an axis parallel to and offset from the axis of said pinion gear;

C. said shift fork being provided with an elongated channel lying in direction substantially transverse to that of the axis of said drive gear and said driven gear, said channel being of size to receive said crank arm stud, the stud being free to slide with respect to said channel; and

D. means for rotating said sector gear about the axis of said shift shaft alternatively in direction to rotate the pinion gear to cause the crank arm stud to move the shift fork

in direction to move the shift collar into and out of engagement with the driven gear.

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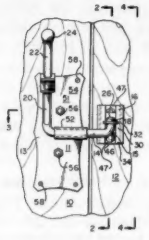
3,920,110
SELF-TIGHTENING DOOR LOCK
Stuart M. Douglas, Grange Street, Smiths Falls, Ontario, Canada
Filed July 15, 1974, Ser. No. 488,399
Claims priority, application Canada, Sept. 19, 1973, 181411
Int. Cl.[2] E05C 3/00; E05B 15/00
U.S. Cl. 292—207 8 Claims



1. A self-tightening lock for preventing movement of a door in relation to an adjacent structure, said door and said adjacent structure comprising two parts, said lock comprising a pivotable member, connecting means for releasably connecting said pivotable member to one of said two parts, pivot and fastening means for pivotably fastening said pivotable member to the other of said two parts, tightening means for tightening said lock including a tightening member slidably mounted on said pivotable member whereby when said lock is mounted on said two parts and said pivotable member is connected to said one of said two parts to prevent movement of said door, said tightening member slides downwardly under gravitational force when said pivotable member is pivoted downwards to a downward position, wedges said pivotable member in said downward position, and thus tightens said lock.

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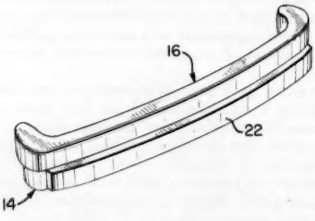
3,920,111
AUTOMOTIVE BUMPER ARRANGEMENT
Toshiaki Endo, Yokosuka; Masateru Takao; Nobuhiro Abe, both of Yokohama; Shuhei Wakita, Fujisawa, and Haruo Kamata, Kamakura, all of Japan, assignors to Nissan Motor Company, Limited, Japan
Filed Dec. 5, 1973, Ser. No. 421,854
Claims priority, application Japan, Dec. 9, 1972, 47-141402
Int. Cl.[2] B60R 19/04
U.S. Cl. 293—97 2 Claims



1. A bumper construction for an automotive vehicle, comprising; a shock-absorbing bumper, installable at a level above the ground which suits the safety of a vehicle, to extend across a relatively raised rear end section of the vehicle; means for balancing the external appearance of the vehicle, comprising a decorative member installable along and adjacent said bumper, to extend across said end section, said decorative member having a lower surface secured to an upper surface of said bumper; and a strip of resilient material secured to an edge of said decorative member and securable to said end section of the vehicle.

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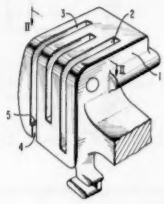
3,920,112
APPARATUS FOR PREVENTING FRAUDULENT OPERATION OF PARKING METERS
Francis Jacques Guillot, "Le Sirius"- Block D, Les Constellations de Fabron, 58 avenue Joseph Giordan, 06 Nice, France
Filed Nov. 9, 1973, Ser. No. 414,359
Claims priority, application France, May 18, 1973, 73.19919
Int. Cl.[2] G07F 3/02
U.S. Cl. 194—102 1 Claim



1. In a parking meter having a coin-receiving block having a plurality of coin-receiving slots each opening through at least two sides of the block, said block being rotatable about a horizontal axis from a coin-receiving position to a position in which the meter is actuated when the coin of proper denomination has been inserted in a slot in the block and the block rotated about said axis; the improvement in which said slot is positioned vertically in said coin-receiving position of said block parallel to and spaced from said horizontal axis and comprises an upper portion that is relatively wide in the direction of the thickness of an inserted coin and a lower portion that is relatively narrow in the direction of the thickness of an inserted coin, said relatively narrow portion opening through the bottom of the block, and at least one horizontal shoulder on the inner surface of the slot separating said upper portion from said lower portion of the slot, said horizontal shoulder extending lengthwise of the bottom of the slot.

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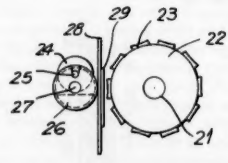
3,920,113
PLATEN ROLL ARRANGEMENT FOR TYPEWHEEL PRINTER
Kazuto Tamai, Matsumoto, Japan, assignor to Kabushiki Kaisha Suwa Seikosha, Tokyo and Shinshu Seiki Kabushiki Kaisha, both of, Japan
Filed Oct. 26, 1973, Ser. No. 409,825
Claims priority, application Japan, Oct. 26, 1972, 47-107335
Int. Cl.[2] B41J 1/32
U.S. Cl. 197—51 6 Claims



1. In a compact printer of the type including at least one rotatable pattern carrier having a circumferential array of characters, numbers, symbols and the like arranged on the peripheral surface thereof, an imprint means for transmitting an imprint of a selected character of said pattern carrier on an

imprint receiver, and an imprint receiver, a print means comprising a press roller for pressing and rolling characters or the like circumferentially arranged on said pattern carrier at a print position thereof against said imprint receiver, a rotatable holder for said press roller rotatable on its own axis and having a recess therein for seating said press roller, a shaft for said press roller, a pair of opposed recesses in the periphery of said holder in which opposed ends of said shaft are journaled, said press roller being freely accommodated in said recess therefor provided in said holder, said press roller having a radius which is longer than the difference between the journal radius of said holder and the distance between the axis of said holder and the axis of said press roller.

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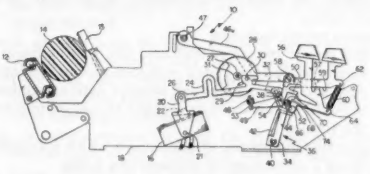
**3,920,114**

## RELEASE AND BLOCKING MECHANISM FOR POWER OPERATED TYPEWRITERS

**Richard E. Shattuck, and Albert H. Cryder, both of Cortland, N.Y., assignors to SCM Corporation, New York, N.Y.**

**Filed Sept. 9, 1974, Ser. No. 504,413**
**Int. Cl.[2] B41J** *29/56*
**U.S. Cl. 197—107** **6 Claims**



1. A release mechanism for a power operated typewriter having a frame, a platen supporting carriage shiftable on the frame between an upper position and a lower position, a keylever operatively connected to the carriage and supported on the frame for movement between a first position with the carriage in the lower position and a second position with the carriage in the upper position, an electrical switch operable between a closed state and an open state for energizing the typewriter, said release mechanism comprising:

locking means supported on the frame for locking the keylever in the second position;

control means supported on the frame for conditioning the electrical switch between the closed state and the open state; and

means movably supported on the frame and responsive to said control means for releasing the keylever from the second position for movement to the first position for locating the carriage in the lower position.

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**3,920,115**

## MONORAIL SUPPORTED FLEXIBLE FRAME ENDLESS CONVEYOR

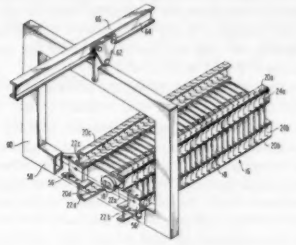
**Joseph Craggs, Taylorville, Ill., assignor to Peabody Coal Company, St. Louis, Mo.**

**Filed Feb. 11, 1974, Ser. No. 441,102**
**Int. Cl.[2] B41J** *29/54*
**U.S. Cl. 198—109** **6 Claims**

1. A conveyor system for transporting coal and the like material from a mining machine to a main conveyor in a room and pillar mine, wherein there are a plurality of straight and curved paths of varying distance between various rooms having mine face against which the machine works and the main conveyor, comprising

a flexible frame for supporting upper and lower runs of an endless belt, said frame being characterized by capability of sidewise curvature sufficient to follow the curves of said paths and said belt being characterized by capability of running around the frame curves, and

a roof-mounted monorail system extending along



at least some of said paths, said system including a main line having a portion overlying said main conveyor and a plurality of branch lines extending from said main line to at least some of said different rooms.

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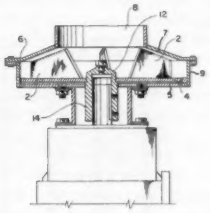
**3,920,116**

## IMPELLER LOADING DEVICE

**Stuart Butler, Willowdale, Canada, assignor to Technovators, Inc., Washington, D.C.**

**Filed Apr. 29, 1974, Ser. No. 464,987**
**Int. Cl.[2] B65G** *31/04*
**U.S. Cl. 198—128** **9 Claims**



1. Bulk handling apparatus for conveying flaky, powered or fine particulate materials in highly compacted form, comprising:

A. impeller means for imparting linear momentum to the particulate material without entraining air therein, said impeller means including:

1. a rotatable disc,

2. a plurality of impeller blades mounted on one side of said rotatable disc, each said impeller blade extending generally radially inwardly from the periphery of said rotatable disc, each said impeller blade having a decreasing height toward the periphery of said rotatable disc,

B. casing means surrounding and encompassing said impeller means for receiving particulate material and retaining said particulate material in substantial contact with said impeller blades for a period of time sufficient to allow compacting of the particulate material and to allow imparting of significant linear momentum thereto and for discharging said compacted particulate material at high linear speed, said casing means including:

1. a first sidewall extending parallel to and closely adjacent said rotatable disc,

2. a second sidewall extending closely adjacent said impeller blades opposite said rotatable disc, said second wall defining a generally frusto-conical surface and containing a centrally located inlet opening for receiving the particulate materials, and

3. a circumferential wall connecting and extending axially between said first and second sidewalls, said circumferential wall including
   a. a first portion extending a substantial circumferential distance around said rotatable disc at an evenly spaced distance from and closely adjacent to the periphery of said rotatable disc and the radial extremities of said blades, and
   b. a second portion extending the remaining circumferential distance around said rotatable disc, said second portion being spaced a spirally, radially increasing distance from the circumference of said rotatable disc terminating in a discharge opening, whereby the particulate material is compacted when impelled by said blades from the central portion to the peripheral portion of said casing means and said first portion of said circumferential wall retains the particulate material in contact with said impeller blades while the spiral shape of said second portion permits the particulate material to separate from said blades without entraining substantial air or losing substantial linear speed.

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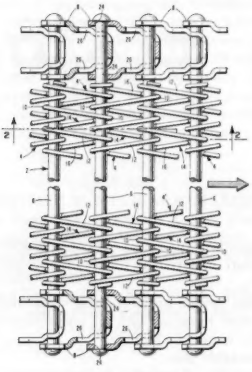
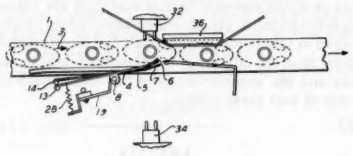
**3,920,117**
**WIRE CONVEYOR BELT**
**Gerald C. Roinestad, Winchester, Va., assignor to Ashworth Bros., Inc., Fall River, Mass.**
**Filed Apr. 23, 1974, Ser. No. 463,416**
**Int. Cl.[2] B65G** *15/54*
**U.S. Cl. 198—194** **11 Claims**



1. A wire conveyor belt comprising:
a plurality of wire links each forming a generally flat helix extending across the belt in a plurality of flat loops defining opposed faces of the links, said faces being generally parallel to the path of travel of the belt, each of said links including
a plurality of arcuate end portions at spaced locations along the link; and
a plurality of elongated connective portions extending across the link at spaced locations on both faces of the link to join said end portions, the connective portions on one face of the link being generally U-shaped to define a channel extending along the link with the base of the channel extending inwardly toward the other face of the link; and
a plurality of connective cross members extending across the belt within the arcs defined by said end portions to pivotally interconnect said wire links.

**3,920,118**
**BOTTLE SENSING APPARATUS**
**Robert J. Krooss, 74 Ball Road, Mountain Lakes, N.J. 07046**
**Filed Oct. 9, 1973, Ser. No. 404,773**
**Int. Cl.[2] B65G** *47/24*
**U.S. Cl. 198—262** **4 Claims**



1. A bottle orientation sensing mechanism for sensing an asymmetry in a bottle comprising:
a first sensing finger positioned to contact a first surface of a bottle and sense an asymmetry in the surface of the bottle
a second sensing finger positioned to sense a second surface of a bottle, said second surface being positioned on substantially the same vertical surface of the bottle as said first surface
a sensing means including
a first sensor associated with said first sensing finger,
a second sensor associated with said second sensing finger, said first and second sensors acting together to indicate the presence or absence of said asymmetry in the surface
means acting in response to said sensors which is adapted to activate a mechanism to reorient said bottle
said first and second sensing fingers comprise long thin members which are mounted for pivotal movement into contact with the bottle
a vertical pivot member on which said sensing fingers are mounted, one of said sensing fingers being mounted directly above the other for movement in a substantially horizontal plane
said sensing means being electric
one end of said first finger adapted to contact the bottle and the first sensor being attached to the other end of the finger and wherein one end of said second finger is adapted to contact the bottle and said second sensor is attached to the other end of said second finger
the first sensor comprising a photoelectric eye and the second sensor comprising a light source, said light source and eye being mounted so that when the first and second fingers are positioned directly above each other, the eye will receive illumination from the light source
a first spring attached to said first finger proximate said first sensor and a second spring attached to said second finger proximate said second sensor, said springs being mounted to bias said fingers into contact with the bottles
a support, said vertical pivot member being mounted thereon and said springs being attached thereto
the asymmetry comprising a grasping means
sensing means being provided to determine the position of said bottle, said sensing fingers being actuatable in this position, and said sensing means comprising photoelectric eyes and light sources which determine the position by locating the neck of the bottle.

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**3,920,119**
**CIGARETTE MATCHES**
**Joseph Szoeke, 57 Portland Place, Yonkers, N.Y. 10703**
**Filed July 19, 1974, Ser. No. 489,912**
**Int. Cl.[2] A24F** *15/18;* **B65D** *85/10*
**U.S. Cl. 206—92** **2 Claims**

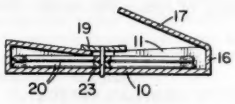
1. A match package formed from a cut and scored paperboard blank or the like and adapted to be secured to a cigarette pack, said match package comprising

a substantially rectangular tray portion, including a back and opposed side and end walls, and

a substantially rectangular striking strip,

each side wall including an attaching flap at its opposed ends and a medial flap on a longitudinal outer edge substantially midway between the ends thereof, each side wall outer edge converging inwardly from one end of its respective side wall toward said medial flap and then diverging outwardly to its opposite respective, and,

each end wall including a flap cover foldably connected to an outer edge thereof, each flap cover being substantially




the same width as said back wall and substantially half the length thereof,

said striking strip includes a match igniting surface, its length being substantially the same as the width of said back wall and substantially two-thirds the width thereof, said attaching flaps being secured to said end walls to form said tray portion, and

an attaching means securing the striking strip and both medial flaps to said back wall with the said flap covers being adapted to be tucked under said striking strip to close said match package.

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**3,920,120**

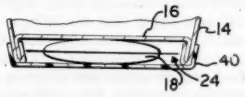
**COMBINATION PACKAGE**

**Andrew P. Shveda, New Canaan, Conn., assignor to Owens-Illinois, Inc., Toledo, Ohio**

**Filed June 11, 1973, Ser. No. 368,673**

**Int. Cl.[2] B65D** *77/00, 3/00*

**U.S. Cl. 206—217** **5 Claims**




1. A combination package for a primary product and a secondary product complementary to said primary product, comprising, in combination:

a tubular sidewall containment member;

a bottom member closing the lower portion of said tubular member, said bottom member being in a spaced-apart relationship with respect to the lowermost portion of said tubular member to thereby define a primary product containment volume above said bottom member and a secondary product containment volume below said bottom member;

a secondary product positioned in said secondary product containment volume; and

a heat-shrunk film of thermoplastic material in engagement with the exterior surface of said tubular sidewall member and extending over the open end of said tubular sidewall member adjacent said secondary product containment volume.

**3,920,121**

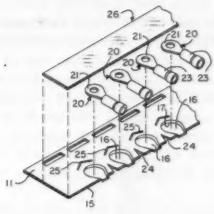
**ELECTRIC TERMINAL CARRIER TAPE AND METHOD OF MANUFACTURE**

**James E. Miller, Westville, N.J., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.**

**Filed Apr. 13, 1972, Ser. No. 243,781**

**Int. Cl. B32b** *3/10, 3/02*

**U.S. Cl. 206—330** **6 Claims**




1. A tape for carrying electric terminals which include noncircular enlarged head and reduced ferrule parts, said tape comprising a flexible strip of deformable material having a plurality of deformations formed in said tape along a side edge thereof, said deformations being embossed portions communicating with said tape side edge and specifically configured noncircular to receive therein conformably the terminal head parts with the respective ferrule parts extending laterally of the strip from the embossed portions beyond the side edge of said strip for assembly with a conductor, securing means extending along said strip to cover said embossed portions and said head parts for releasably securing said head parts to said strip, and feeding means on said strip for receiving a drive for feeding the strip with said terminals to an assembly location, said strip having cuts adjacent to said embossed portions to enable embossment without distorting the rectitude of said strip.

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**3,920,122**

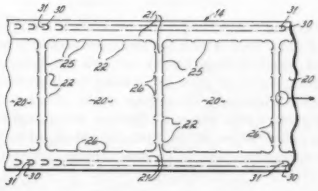
**LABEL WEB AND DIE MAKING METHODS**

**Allen W. Koehlinger, Cincinnati, Ohio, and Wesley J. Rece, Jr., California, Ky., assignors to R. A. Jones & Co., Inc., Covington, Ky.**

**Filed Dec. 26, 1973, Ser. No. 428,362**

**Int. Cl.[2] B65D** *85/67;* **B32B** *3/10;* **G09B** *3/02*

**U.S. Cl. 206—390** **17 Claims**




1. A rolled, preprinted, precut label supply including an elongated web supporting labels therein, for use in apparatus adapted to apply labels to products, said apparatus including means for establishing a tacky surface to one side of said labels, a reciprocating resilient plunger means for engaging labels, for passing through said web and detacning labels therefrom, for carrying labels toward and applying labels to products, and thereafter withdrawing through a web remnant, said resilient plunger means having a forward label engaging face with a predetermined shape, and sprocket means for transporting said web through said label applying apparatus, said preprinted, precut label supply comprising:

an elongated web in the form of a roll including a plurality of labels and a web remnant to which said labels are attached, said labels being located throughout said remnant from one end to the other of said web,

said labels being partially cut from said web remnant by a plurality of cuts extending completely through said web to define label profiles therein, the ends of said cuts comprising curves each having spaced apart from a corresponding curve of another cut to leave bridging means between said labels and said web remnant thereby to releasably hold said labels in said remnant,

each of said bridging means having a predetermined width varying from a greater width at an end of said bridging means near said web remnant to a lesser width at an opposite end of said briding means near said label so as to permit the detachment of said labels by said resilient plunger, transversely to said web remnant, without indiscriminate tearing of the label and such that the major portion of said bridging means remains with said web remnant,

said labels having two sides, at least one of which is adapted to bear printed indicia, and

sprocket holes in said web remnant and extending therealong, said sprocket holes disposed in said remnant to permit accurate registration of said remnant and said labels with respect to said resilient plunger.

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**3,920,123**

**PACKAGING UNDER HEAT-SHRUNK FILM**

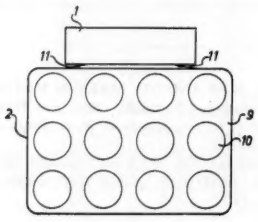
**Nerio Martelli, Bologna, Italy, assignor to Solvay & Cie, Brussels, Belgium**

**Filed Mar. 18, 1974, Ser. No. 452,331**

**Claims priority, application France, Mar. 28, 1973, 73.11714**

**Int. Cl.[2] B65D** *65/16, 85/62*

**U.S. Cl. 206—497** **5 Claims**




1. Packaging comprising a film which is folded over edge to edge to form a loop which encloses the products to be packaged and which is heat-shrunk around the latter, said loop being closed on three sides by welding the lateral sides of the loop before shrinkage, an edging made of a relatively rigid material glued to the edges of the film before shrinkage, and the ends of the edges of the film are not glued to the edging in order to enable them to contract freely during the shrinkage.

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**3,920,124**

**FABRIC ROLL SORTING METHOD**

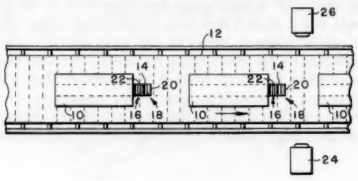
**Robert Allen Patterson, Spartanburg, S.C., assignor to Deering Milliken Research Corporation, Spartanburg, S.C.**

**Filed Dec. 9, 1974, Ser. No. 530,762**

**Int. Cl.[2] B07C** *5/342*

**U.S. Cl. 209—111.7** **2 Claims**

1. A method to sort rolls of material having an insert in one end with at least two sets of indicia on the insert: conveying a plurality of rolls of material past a detection station, scanning the insert to detect one set of indicia to allow a code reader to energize an actuator upon the detection of certain pre-determined information in the other set of indicia and reading the other set of indicia and energizing an actuator




upon the reading of certain information of the other set of indicia.

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**3,920,125**

**DISPLAY DEVICE**

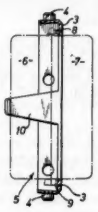
**Paul Alexander Weinstein, Hendon, England, assignor to Clarmere Limited, London, England**

**Continuation of Ser. No. 380,402, July 18, 1973, abandoned. This application Jan. 10, 1975, Ser. No. 540,097**

**Claims priority, application United Kingdom, July 21, 1972, 34350/72**

**Int. Cl.[2] E05B** *73/00*

**U.S. Cl. 211—4** **4 Claims**




1. A display device comprising an assemblage of rectangular frames each frame being of angle section having a front flange and a side flange, a rectangular box comprising a top portion and a base portion joined to one another by a protruding hinge, one of said boxes being fitted and located in each of said frames with said protruding hinge disposed behind the front flange of said frame, the side flanges of said frames having male and female elements for detachably interconnecting same, each frame being provided with rearwardly extending resilient retaining elements, said retaining elements terminating in inwardly extending lugs, said retaining elements permitting the insertion and withdrawal of a box in each frame with said protruding hinge engaging said front flange and preventing movement of said box in one direction and said lugs engaging said box and preventing movement in the opposite direction with respect to said frame.

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**3,920,126**

**LOCKABLE BICYCLE RACK**

**Francis T. Candlin, 280 Madison St., Denver, Colo. 80206**

**Filed Dec. 26, 1972, Ser. No. 317,946**

**Int. Cl.[2] E05B** *73/00*

**U.S. Cl. 211—5** **7 Claims**

1. A lockable bicycle rack for securing a bicycle having a frame and a front and rear wheel attached to said frame, said frame including a cross-bar extending generally between said front and rear wheels, said rack comprising:

a. base means for supporting the rack on a horizontal surface;

b. at least one pair of upright members arranged to extend upwardly from said base means, whereby the bicycle may

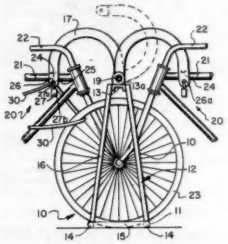
be supported in an upright, horizontal position when at least a wheel of the bicycle is insertd therebetween;

c. pivotal attaching means having at least one arcuate arm pivotally attached at one end near the top of said upright members so that the free end may be pivoted over the bicycle handle bars to contact the crossbar of the bicycle frame;

d. lock means for attaching the free end of said arcuate arm to the bicycle crossbar, said lock means includes fastening means provided at the free end of the arcuate arm to secure the arcuate arm to the crossbar of the bicycle; and

e. cable means permanently afixed at one end to a portion of the rack and the opposite end having an attachment means, said cable means being of a sufficient length to be interwoven through the wheels and frame of the bicycle, and the attachment means of the cable means being arranged to be secured to said lock means to prevent the unauthorized removal of the bicycle or the wheels thereof from said rack.

**7.** A lockable bicycle rack adapted for securing a bicycle having a frame, front and rear wheels attached to said frame, said frame including a cross bar extending between said front and rear wheels, and a handle bar extending above said front wheel and forwardly of said cross bar, said rack comprising:



a. base means for supporting the rack on a horizontal surface,

b. a top member disposed for horizontal extension above and in spaced relation to said base means whereby the front wheel of the bicycle may be inserted in said rack beneath said top member,

c. pivotal attaching means having at least one arcuate arm with an inner concave surface portion extending the greater length of said arcuate arm, said arcuate arm pivotally attached at one end to said top member for upward extension therefrom so that the free end is pivotal over the handle bars to engage the cross bar of the bicycle with the inner concave surface extending over the handle bars,

d. lock means for attaching the free end of said arcuate arm to the bicycle cross bar, said lock means includes fastening means provided at the free end of the arcuate arm to secure the arcuate arm to the cross bar of the bicycle, and

e. cable means permanently affixed at one end to a portion of the rack and the opposite end having an attachment means, said cable means being of a sufficient length to be interwoven through the wheels and frame of the bicycle, and the attachment means of the cable means being arranged to be secured to said lock means to prevent the unauthorized removal of the bicycle or the wheels thereof from said rack.

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**3,920,127**

## FOLDING RACK FOR CLOTHES HANGERS

**Louis J. LaBeaud, P.O. Box 50814, New Orleans, La. 70150**

**Filed Mar. 5, 1975, Ser. No. 555,658**
**Int. Cl.[2] A47F** *5/08*
**U.S. Cl. 211—118** **10 Claims**

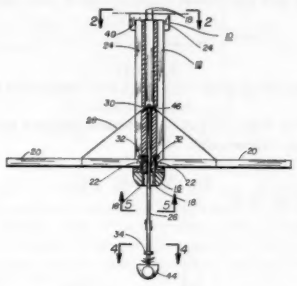
**1.** A folding rack for clothes hangers comprising in combination:

a. a ceiling mount for securing to an overhead;

b. a tubular body for securing to said ceiling mount by an end, and defining a longitudinal center hole, a transverse hole between its ends, and oppositely disposed external channels extending longitudinally from end to end and transversely to intersect outboard ends of said transverse hole;

c. a pair of arms adapted to respectively fit into said channels and pivotally mounted therein by pivots through similar ends of said arms adjacent the ends of channels remote from said ceiling mount;

d. an operating shaft slidably mounted in said longitudinal center hole for travel of an end between said transverse



hole and the end of said tubular body adjacent said ceiling mount, and for rotating relative to said tubular body, said shaft defining adjacent to said shaft end a transverse hole therethrough for registering with said transverse hole defined in said tubular body at the lower end of said shaft travel;

e. a tension line for threading through said transverse holes in said tubular body and operating shaft and secured to said arms an equal distance from similar arm ends; said line being adapted to travel with said operating shaft in said center hole above said transverse hole; and

f. Means for locking said operating shaft in a fully inserted position in said tubular body, thereby locking said arms in folded position in said channels.

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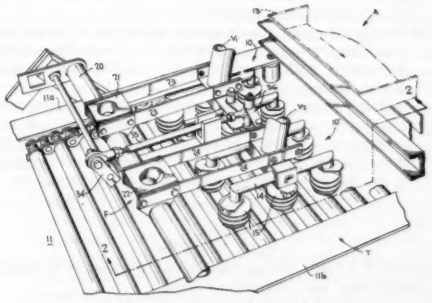
**3,920,128**

## ARTICLE TRANSFER SYSTEM WITH SPATIAL ADJUSTMENT

**Thomas R. Baker, Redwood City, Calif., assignor to Kliklok Corporation, Greenwich, Conn.**

**Filed Jan. 25, 1974, Ser. No. 436,612**
**Int. Cl.[2] B65G** *47/02*
**U.S. Cl. 214—1 BV** **7 Claims**



**1.** An article transfer system comprising an infeed conveyor for providing a group of articles in substantially a planar array at a transfer station, a plurality of article pickup heads corresponding to said array, each of said heads comprising a col-

lapsible suction cup, and cup support means including a pneumatic manifold, and vacuum means connecting said manifold to effect attachment of said array of articles to the corresponding cup when said heads are brought into engagement therewith, said support means for said pickup heads being relatively movable to shift the same as a gang with respect to said transfer station and an output area having different spatial requirements for said array, and means to tilt at least one of said pickup heads toward or away from at least one adjacent pickup head, said tilt means being provided by anti-collapse stiffening means on one side of said cups opposite to the direction of the tilting action, whereby said array is compacted or spread and the spatial requirement of said output area is met.

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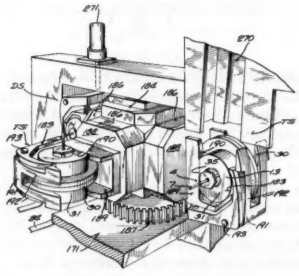
**3,920,129**
**APPARATUS FOR AUTOMATIC PRODUCTION OF ARMATURES**

**Arnold P. le Vasseur, Lakeville, Minn., assignor to Possis Corporation, Minneapolis, Minn.**

**Filed June 7, 1974, Ser. No. 477,549**
**Int. Cl.[2] B66C** *1/62*
**U.S. Cl. 214—1 Q** **18 Claims**



**1.** In apparatus for presenting articles to a work station at which power actuated mechanism performs an operation upon the articles, the performance of which requires that the articles be presented to said mechanism in predetermined orientation with respect thereto, said apparatus including a plurality of identical carriers each having a cavity to receive an article, and a circular periphery on which the carrier rolls down an inclined track to the work station, the improvement by which said predetermined orientation is assured, comprising:

A. rotation interrupting means on each carrier spaced from its axis of rotation and by which the carrier can be held in a predetermined position of rotation;

B. locating means on each carrier to engage an article inserted into its cavity and hold the same in predetermined orientation with respect to the rotation interrupting means on the carrier; and

C. holding means at the work station cooperable with said rotation interrupting means on the carriers to hold the carriers in a position of rotation in which the articles therein are in said predetermined orientation with respect to the power actuated mechanism at the work station.

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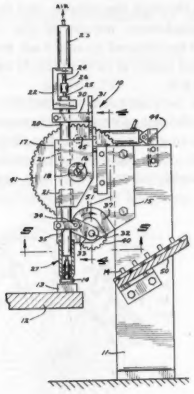
**3,920,130**
**PART LOADER**

**Clifford T. Edgett, Minneapolis, Minn., assignor to Inventors Engineering, Inc., Minneapolis, Minn.**

**Filed July 5, 1974, Ser. No. 485,911**
**Int. Cl.[2] B21G** *13/10*
**U.S. Cl. 214—1 BD** **3 Claims**

**1.** A transfer machine for moving parts from a part supply to an assembly position laterally offset from the part supply comprising a support, means to mount said support adjacent to a supply of parts, a pivot bracket, means to pivotally mount said pivot bracket on said support for movement about a first axis oriented so that said pivot bracket moves in a lateral direction relative to a part supply when it pivots, a part pick up member including a shaft slidably mounted on said pivot bracket for movement along its longitudinal axis, and chuck means on said shaft for picking up a part from a part supply and releasing a held part, means defining a guide track on said support adjacent to said shaft, and drive means for said shaft and chuck means including bracket means attached to said shaft, a connecting member connected to said bracket means,



a track follower mounted in said drive track and connected to said connecting member, and a mechanical crank arm linkage driving said connecting member, and thereby said bracket means and track follower, said drive means being adapted to drive said shaft along its longitudinal axis and at the same time control movement of said pivot bracket about its pivot axis, said crank arm and track means being positioned so that as said crank arm moves in an oscillating stroke, said chuck means and shaft are first moved in axial direction of said shaft relative to said pivot bracket at either end of said oscillating stroke, and in the midportions of said oscillating stroke said chuck means is moved laterally about said first axis.

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**3,920,131**
**LOADER ASSEMBLY FOR A MACHINE TOOL**

**Kurt M. Gebel, Waynesboro, Pa., assignor to Landis Tool Company, Waynesboro, Pa.**

**Filed Nov. 7, 1974, Ser. No. 521,786**
**Int. Cl.[2] B23B** *15/00*
**U.S. Cl. 214—1 BD** **4 Claims**

**1.** A loader assembly comprising

means for sequentially delivering a plurality of workpieces to a pick up station,

pivot arm means selectively pivotally displaceable about a predetermined pivot in a first direction from a retracted position whereat a workpiece can be delivered by said delivering means to said pick up station, to the pick up station whereat the delivered workpiece can be secured to said pivot arm means, to a grinding station whereat the secured workpiece can be suitably gripped by the centers of a grinding machine or the like and selectively, pivotally displaceable in the opposite direction from the grinding station to said retracted position,

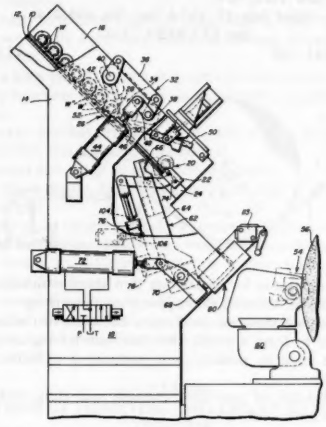
means for pivotally displacing said pivot arm means from said grinding station to said retracted position,

spring means selectively compressible from a first predetermined size to a second compressed size,

said pivot arm means selectively engaging and compressing said spring means from said first predetermined size to said second compressed size as said pivot arm means is pivotally displaced in said opposite direction from said pick up station to said retracted position,

means for maintaining said spring means at said second compressed size while said delivering means delivers a workpiece to said pick up station,

means for releasing said maintaining means when a workpiece has been delivered to said pick up station whereby



said pivot arm means will be pivotally displaced from said retracted position to said pick up station,

means for securing a delivered workpiece to said pivot arm means when said pivot arm means is at said pick up station,

means for pivotally displacing said pivot arm means from said pick up station to said grinding station after a workpiece has been secured to said pivot arm means, and

means for releasing said securing means after said pivot arm means has been displaced to said grinding station.

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**3,920,132**

**MATERIALS HANDLING DEVICE**

**William Pettigrew Cleland, Biggar, and William Law Goldie, Glasgow, both of Scotland, assignors to British Steel Corporation, London, England**

**Continuation of Ser. No. 314,385, Dec. 12, 1972, abandoned. This application Aug. 8, 1974, Ser. No. 495,810**

**Claims priority, application United Kingdom, Dec. 17, 1971, 58749/71**

**Int. Cl.[2] B65G** *57/00*

**U.S. Cl. 214—6 DS** **11 Claims**

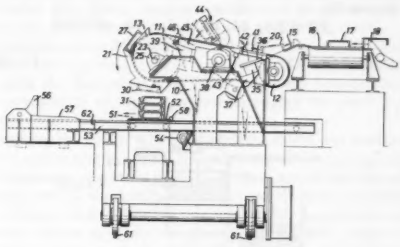
**1.** A plurality of endless conveyors for transferring lengths of ferromagnetic material from a loading station to an unloading station, each of the plurality of endless conveyors travelling around pulleys having a first common axis of rotation at the unloading station,

means at the loading station for loading successive lengths of ferromagnetic material crosswise to the path of travel of said plurality of endless conveyors,

a plurality of activatable electromagnetic wheels each being mounted for rotation through 360° about a second common axis and spaced in between said plurality of endless conveyors, each one of said wheels comprising a core carrying at least two generally annular pole pieces extending radially beyond the core and provided with a plurality of edge notches corresponding to the receiving position of each one of a succession of said lengths of ferromagnetic material.

said first common axis being spaced from said second common axis such that the path of travel of the endless conveyors towards the unloading station intersects the path of travel of the electromagnetic wheels,

WHEREBY, each one of the lengths of ferromagnetic material is transferred from the endless conveyors to the elec-



tromagnetic wheels and held by the electromagnetic wheels until upon rotation through half a turn and subsequent deactivation of the electromagnetic wheels, lengths of ferromagnetic material are successively deposited onto a receiving surface which lies below the electromagnetic wheels.

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**3,920,133**

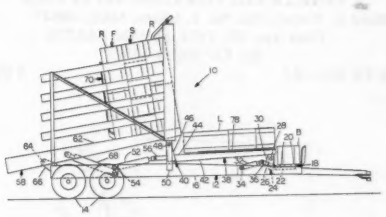
**BALE POSITION SENSING AND CONTROL MECHANISM**

**L. Dennis Butler, Kingsburg, and Anthony E. Furtado, Riverdale, both of Calif., assignors to Sperry Rand Corporation, New Holland, Pa.**

**Filed May 24, 1974, Ser. No. 473,262**

**Int. Cl.[2] A01D** *87/12*; **B65G** *57/32*

**U.S. Cl. 214—6 B** **4 Claims**



**1.** In a bale wagon having a first table for accumulating a plurality of at least two bales end-to-end in a row, means for advancing bales along said first table from a bale-receiving end thereof, means disposed along said first table for receiving said bales therefrom and accumulating bales into a tier thereof, and means for transferring said bales from said first table to said tier-accumulating means, an improved means for controlling the actuation of said transferring means and thus the placement of said plurality of bales with respect to said tier-accumulating means upon being transfer thereto, comprising:

means located remote from said bale-receiving end of said first table for actuating said transferring means upon being engaged and displaced by a leading end of a first of said plurality of bales received on said first table; and

means for sensing a trailing end of a last of said plurality of bales received on said first table, said sensing means also for preventing said actuating means from actuating said transferring means upon said actuating means being engaged and displaced by said leading end of said first of said plurality of bales received on said first table until said last of said plurality of bales is received on said first table

and said trailing end of said last bale is sensed by said sensing means.

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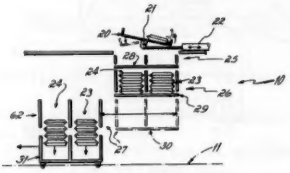
**3,920,134**
**DROP LOADER**
**Eric W. Scarpa, Cincinnati, Ohio, and Robert J. Weichhand, Fort Wright, Ky., assignors to R. A. Jones & Co. Inc., Covington, Ky.**
**Filed July 24, 1974, Ser. No. 491,313**
**Int. Cl.[2] B65G** *67/04*
**U.S. Cl. 214—43** **10 Claims**



**10.** In apparatus for loading articles into product buckets of a conveyor moving continuously with respect to a fixed base, the combination comprising,

a loader overlying said conveyor and having article supporting doors which are movable between open and closed positions,

means for depositing articles on said doors,

means for longitudinally reciprocating said loader over said conveyor,

and means for moving said doors to open position to drop articles into said product buckets as said loader is moving in the direction of said conveyor.

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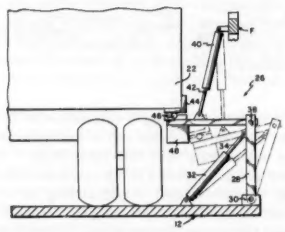
**3,920,135**
**VEHICLE BED VIBRATING APPARATUS**
**Clifford C. Wetzel, Rte. No. 2, Ithaca, Mich. 48847**
**Filed Apr. 29, 1974, Ser. No. 464,756**
**Int. Cl.[2] B65G** *67/40*
**U.S. Cl. 214—53** **3 Claims**



**1.** For use in combination with a tilting platform operable to support the load-carrying bed of a vehicle in a rearwardly inclined dumping position on said platform to gravitationally dump a load from said bed;

a vibrator assembly for vibrating said bed during the load dumping operation comprising a bracket member simultaneously engageable with adjacent lower and side surfaces of the vehicle bed, first power driven means on said platform for raising and lowering said bracket member relative to said platform, second power driven means on said platform operable independently of said first power driven means for shifting said bracket generally horizontally relative to said platform; said first and second power driven means being operable to shift said bracket between a retracted position clear of the path of movement of a vehicle to and from said dumping position and an operative position wherein said bracket is forcibly held in engagement with a lower and adjacent side surface of a vehicle bed; and

vibrating means mechanically coupled to said bracket for imparting vibration of said bracket.

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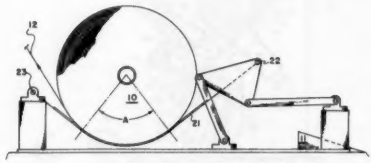
**3,920,136**
**AIR CUSHION UNWIND SUPPORT FOR REELED SHEET**
**David F. Talbert, Millboro, Va., assignor to Westvaco Corporation, New York, N.Y.**
**Filed July 15, 1974, Ser. No. 488,414**
**Int. Cl.[2] B65H** *75/02*
**U.S. Cl. 242—55** **11 Claims**



**1.** An apparatus for dispensing thin sheet material from a cylindrical reel thereof, said apparatus comprising:

A. a flexible sling means draped between two suspension points to form a cradle therebetween having an arcuate bight area to position and support a cylindrical reel therein;

B. a plurality of apertures through said sling within said bight area; and,

C. pressurized fluid supply means in communication with said apertures for discharging a continuous fluid flow between said sling and said cylindrical reel, said apertures being positioned on said sling means to channel the dominance of said fluid flow along the circumference of said reel between the outer periphery thereof and the bight area of said sling means.

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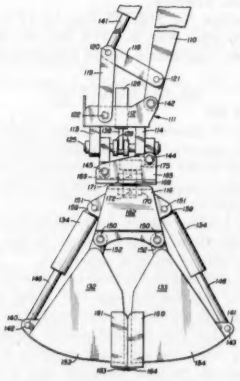
**3,920,137**
**EXCAVATING MACHINE WITH CLAMSHELL BUCKET**
**Willard E. McCain, 6431 W. Heidler Road, Fairview, Pa. 16415**
**Filed Apr. 8, 1974, Ser. No. 458,682**
**Int. Cl.[2] B66F** *9/12*
**U.S. Cl. 214—140** **16 Claims**



**1.** In combination, a dipper stick, a first bucket and a second bucket,

a bucket support means having laterally spaced upwardly extending side members,
the end of said dipper stick being disposed between said side members and pivotably connected thereto,
means supporting said buckets about a first axis comprising a transverse pin extending through said side members and through said dipper stick and swingably connecting said bucket support means to said dipper stick,
tilting means connected to said bucket support means and to said dipper stick for tilting said bucket support means about said transverse pin,
a tilt support,
upwardly extending brackets connected to said tilt support, downwardly extending brackets on said bucket support means,
and a king pin extending through said downwardly extending brackets and through said upwardly extending brackets,
a bucket bracket pivotally connected to said tilt support,
a first link fixed to said first bucket,
a second link fixed to said second bucket,
first pivot means connecting said first link to said bucket bracket,
second pivot means pivotally connecting said second link to said bucket bracket,
and means for swinging said first bucket relative to said bucket bracket,
and means for swinging said second bucket relative to said bucket bracket whereby said buckets can be swung toward and away from each other.

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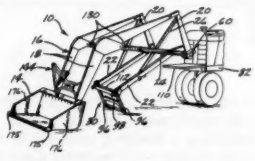
**3,920,138**

## METHOD OF MOUNTING IMPLEMENT DEVICE ON TRACTOR

**Eldon M. Frank, Rte. 1, Lake View, Iowa 51450**

**Division of Ser. No. 260,465, June 7, 1972, Pat. No. 3,863,786. This application July 16, 1973, Ser. No. 379,753**
**Int. Cl.² E02F** *3/70*
**U.S. Cl. 214—152** **3 Claims**



**1.** The method of mounting an implement on a tractor, said implement being initially detached from the tractor and including a frame having vertical side frame members for being positioned on opposite sides of said tractor, a boom pivotally connected to the upper ends of said side frame members and extending forwardly thereof, a power means for selectively pivoting said boom relative to said upstandind side frame members, a working tool on the outer end of said boom supportingly engaging the ground, horizontally disposed forwardly extending side frame members connected at their rear ends to the lower ends of said upstanding side frame members and said tractor including a load-bearing support pad on opposite sides of said tractor for engaging the lower end of said upstanding side frame members, forward pivot support brackets on opposite sides of said tractor for engaging cooperating means on said horizontally disposed side frame members, forwardly of said load-bearing support pads, said implement adapted to pivot about a pivotal axis through said pivotal supports between a horizontal position when mounted on the tractor and an angular position when supported on the ground, a stand rigidly connected to said horizontal side frame members and supportingly engaging the ground with said implement in said angular position with the rear ends of said horizontal side frame members extending upwardly, and said working tool engaging the ground to fully support said implement and limit it against forward movement relative to said tractor, said forward pivot brackets and said cooperating means including laterally outwardly oppositely extending stationary pivot support arms on said tractor and longitudinally spaced apart downwardly facing stop elements on said horizontal side frame members positioned to receive said pivot arms therebetween comprising the following steps,

driving the tractor into said implement in said angular position between said vertical and horizontal frame members until the horizontal side frame members between said downwardly facing stop elements engage the pivot support arms on said tractor,

operating the power means to pivot the boom and horizontal side frame members towards each other causing said implement and stand to pivot about a pivotal axis through said pivotal supports to said horizontal mounted position without relative forward or rearward movement between said tractor and implement and said rearmost stop elements move to positions on the rear sides of said pivot arms and in the plane of said pivot arms to limit forward movement of said implement relative to said tractor as said stand is raised off the ground and to align said implement on said tractor for said uprights to engage said support pads, and

locking said upstanding side frame members to said load-bearing support pads on opposite sides of said tractor.

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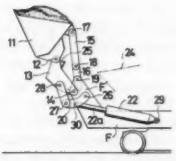
**3,920,139**

## BUCKET DEVICE FOR ROCKER SHOVEL

**Shuichi Nagoshi, Kanagawa, Japan, assignor to Mitsui Shipbuilding and Engineering Co., Ltd., Tokyo, Japan**

**Filed Oct. 3, 1973, Ser. No. 403,265**
**Claims priority, application Japan, Oct. 5, 1972, 47-100436**
**Int. Cl.² E02F** *3/34*
**U.S. Cl. 214—765** **1 Claim**



**1.** A bucket device for a rocker shovel comprising a body frame, a link member pivotally connected at one end thereof to said body frame for rotation about a horizontal axis, a bucket pivotally supported at the back bottom portion thereof by the other end of said link member, a first stopper on said link member for restricting the backward pivotal dumping movement of said bucket with respect to said link member, a hydraulic cylinder pivotally attached to said body frame and said link member for selectively rotating said link member, a first link pivotally connected at one end thereof to said bucket at a point above the connection of said bucket to said link member, a second link pivotally connected at one end thereof to the free end of said first link and at the other end thereof to said body frame at a point spaced above the point of connection of said link member to said body frame, and a second stopper on said body frame for limiting the rotation of said second link, whereby the upward rotation of said link member by said hydraulic cylinder produces a rotation of said bucket with respect to said link member away from said frist stopper, the engagement of said second link with said second stopper causing said first and second links to rotate in opposite directions thereby initiating a dumping movement of said bucket which is continued by the weight of the bucket and contents

when the center of gravity thereof crosses the vertical plane containing the bucket pivot connection with said link member.

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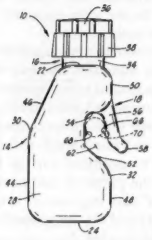
**3,920,140**
**INSULATED CONTAINER**
**Cecil M. Kiser, 128 N. Main, Newkirk, Okla. 74647**
**Filed Apr. 29, 1974, Ser. No. 465,267**
**Int. Cl.² B65D** *25/22*
**U.S. Cl. 215—100 R** **3 Claims**



**1.** An insulated container and mount therefor, comprising:
a. a container for liquids having a top, a bottom, and sidewalls, said top, bottom, said sidewalls having means insulating said container,
b. said container having an aperture in an upper portion thereof,
c. said container having a flexible arm member integrally formed with one of said sidewalls and extending from the sidewall,
d. said container being small in cross-section in its upper end portion and having one of said sidewalls inclined inwardly and upwardly in an upper end portion, and
e. a pair of opposite protrusions, one on said arm member and the other on a sidewall adjacent thereto, said protrusions being spaced to in use grip and position a bar-like member between said protrusions and the juncture of said sidewall and said arm member, said container being constructed and adapted to be used for carrying and storing a liquid with said container being mountable on a bar-like member or supporting structure portion of a vehicle or the like with said inclined upper sidewall being positionable when mounted to provide clearance for normal operation of said vehicle or the like.

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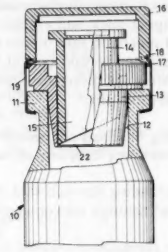
**3,920,141**
**STOPPER FOR CONTAINERS, ESPECIALLY BOTTLES AND FLASKS**
**Tiziano Bojardi, Viale Indipendenza 39, Trezzano S/Naviglio, Italy**
**Filed Apr. 23, 1974, Ser. No. 463,351**
**Claims priority, application Italy, Jan. 8, 1974, 19197/74**
**Int. Cl.² B65D** *41/40*
**U.S. Cl. 215—251** **6 Claims**

**1.** A stopper for a container having a neck devoid of screw threads, the neck having an upper edge defining an open end and a radially extending bead having a bottom wall formed on the container neck adjacent the neck upper edge comprising, in combination, the cap having a bottom edge portion disposed above the bottom wall of the bead on a container, a downwardly extending, annular flange on said cap adjacent said bottom edge portion, and annular sealing strip having a circumferentially extending upper edge portion disposed in overlying clamping engagement with said flange and a circumferentially extending lower edge portion disposed in underlying clamping engagement with the bottom wall of said bead with said cap extending upwardly from said sealing strip, said strip being provided with a plurality of circumferentially spaced, axially extending break lines whereby a tilting force



applied laterally to said cap ruptures said strip along one or more of said break lines.

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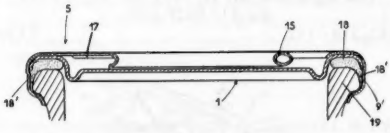
**3,920,142**
**EASILY OPERABLE CLOSURE CAP**
**Roger Vandrebeck, Saint-Serein sur l'Isle; Paul Crouzet, Marseille, and Claude Sourbet, Paris, all of France, assignors to SCAL - Societe de Conditionnements en Aluminum, Paris, France**
**Filed June 24, 1974, Ser. No. 482,204**
**Int. Cl.² B65D** *41/42*
**U.S. Cl. 215—254** **13 Claims**



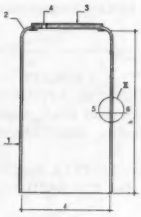
**1.** A metal cap assembly for closure of containers having a collar about the open mouth of the container, said metal cap assembly comprising a two-part assembly in which one part comprises a disc-shaped cover member dimensioned to overlie at least a portion of the collar, the second part comprising an annular member having a central body portion and an integral peripheral portion adapted to be crimped onto the collar at the mouth of the container, said central body portion having a central aperture and a slot spaced outwardly of and extending about the central aperture to provide a gripping portion between said aperture and slot and a web portion connecting the gripping portion with the peripheral portion, a first line of weakness extending in a radial direction from one end of the slot to the edge of the annular member to permit the member to be drawn along the line of weakness in a radial direction, and at least one second line of weakness extending from the slot at an angle which is no greater than 90° to the axis of symmetry of the cap and confined to the central body portion of the annular member, a coating on the surface of the one part facing the second part in the assembled relation to promote adhesion of a sealing material between the parts, a coating on the surface of the second part facing the first part in the assembled relation, which minimizes adhesion of said sealing material, and a sealing material at the junction between the disc-shaped cover member of the one part and the peripheral portion of the annular member of the second part to establish a sealing relationship therebetween when in the assembled relation.

3,920,143

## PLASTIC CAP FOR STOPPERING BOTTLES

Jean-Marie Vouillemin, Sainte-Menehould, France, assignor to Tuboplast-France, Paris, France

Filed Apr. 30, 1975, Ser. No. 573,083
Claims priority, application Luxemburg, June 12, 1974, 70300
Int. Cl.[2] B65D 41/22
U.S. Cl. 215—307 5 Claims



1. A plastic cap for stoppering bottles and the like comprising a cylindrical plastic skirt open at both ends, a circular disc secured within one of said openings to close said one end, the body of said skirt having an inner and an outer layer being formed by the coextrusion of two thermoplastic materials of the same family, the inner layer of the skirt containing an additive which reduces the rubbing factor.

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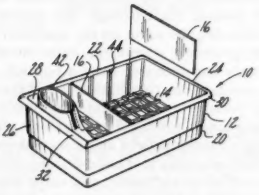
3,920,144

## FOOTWEAR DRIP STALL

Virginia R. Callen, 7202 W. Carpenter Road, Flushing, Mich. 48433

Filed Mar. 29, 1973, Ser. No. 345,888
Int. Cl.[2] B65D 1/24
U.S. Cl. 220—22 5 Claims



1. In a stall for a footwear item for removably storing a footwear item therewithin, the improvement comprising:

a. an open-topped basin member having an upper portion and a lower portion and a base, the member having a pair of opposed substantially parallel sidewalls and a pair of opposed substantially parallel end walls,

b. a shoulder formed within the basin at the junction of the upper portion and the lower portion,

c. a removable grate which seats atop the shoulder and which horizontally traverses the interior of the basin member,

d. means for compartmentalizing the upper portion of the basin member into a plurality of compartments, the means for compartmentalizing comprising a plurality of pairs of retaining means and a plurality of partitions, the partitions being removably retained in the upper portion by the pairs of retaining means such that each compartment removably stores at least one pair of the footwear items, therewithin, and

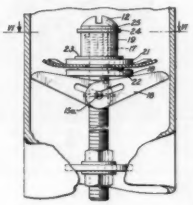
e. drain means formed in the lower portion of the basin to remove water therefrom.

3,920,145

## ANTI-SIPHONING DEVICE FOR FLUID CONTAINERS

John D. McGregor, Baton Rouge, and Sterling M. Boldreaux, New Orleans, both of La., assignors to Stone Manufacturing, Inc., Baton Rouge, La.

Filed Feb. 20, 1974, Ser. No. 444,064
Int. Cl.[2] B67C 3/00; F16B 35/00; 21/02
U.S. Cl. 220—86 AT 30 Claims



1. A device for preventing the siphoning of liquid from a fluid container having a tubular inlet pasageway, said device comprising:

a. a threaded elongated bolt member having a head at one end thereof,

b. expandable holding means disposed on the threaded bolt,

c. tightening means for effecting movement of the holding means along the bolt member,

d. spring-loaded biasing means for expanding the holding means outwardly with respect to the longitudinal axis of the threaded bolt,

e. spacer means disposed on the bolt member for providing a mechanical force which will override the spring-loaded biasing means after the device is disposed within the inlet passageway,

f. alignment means disposed on the end of the threaded bolt opposite said head end for guiding the device into position within the inlet passage.

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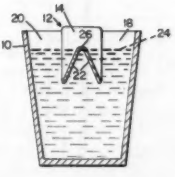
3,920,146

## NON-SPILLING DEVICE

Albert H. Baller, 59 Beech St., Clinton, Mass. 01510

Filed May 31, 1973, Ser. No. 365,470
Int. Cl.[2] A47G 19/22
U.S. Cl. 220—90.4 8 Claims



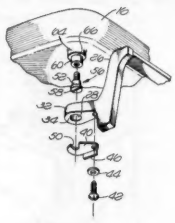
1. A vessel comprising an open top lidless container and means forming a vacuum in the container when the latter is substantially filled, said means comprising an inverted trough including a pair of barriers diverging downwardly and extending for a major portion of the depth of the vessel.

**3,920,147**

## LATCHING LEG-HANDLE ASSEMBLY

**Russell D. Hiatt, West Bend, Wis., assignor to Dart Industries Inc., Los Angeles, Calif.**

**Filed Aug. 9, 1974, Ser. No. 495,937**
**Int. Cl.[2] B65D** *25/28*
**U.S. Cl. 220—94 R** **5 Claims**



**1.** A latching leg-handle assembly for a domestic utensil comprising:

a utensil having spaced-apart upright members extending from a bottom surface adjacent a side thereof, said members each having a latch engagement means and comprise a raised abutment member having an annular planar surface from which extends a boss;

a leg-handle structure including a pair of legs having a handle extending therebetween and a support portion extending laterally from each leg about below the midpoint thereof, said support portion including a planar surface adapted to contact said annular surface of said upright member when said leg-handle structure is latched to the utensil, said support portion further including an orifice through which an upright member may be inserted; and,

a latch pivotally mounted on said support portion adjacent said orifice and adapted to engage the latch engagement means when an upright member is inserted through said orifice.

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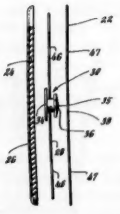
**3,920,148**

## PAD GRIPPING DEVICE

**Edward Szymansky, Fairfield, Conn., assignor to Sperry Rand Corporation, Bridgeport, Conn.**

**Filed June 14, 1974, Ser. No. 479,310**
**Int. Cl.[2] B65D** *25/28*
**U.S. Cl. 220—94 R** **4 Claims**



**1.** A pad gripping device adapted to be mounted on the outer surface of a hand-held appliance, said gripping device comprising,

a. a pillow-like pad assembly including a backing member and a resilient cushion disposed on said backing member,

b. means for mounting said pad on the outer surface of the casing of the appliance,

c. a flexible support plate being part of said assembly,

d. fastener means associated with said plate and having portions extending outwardly of said pad assembly adapted for locking engagement with the appliance casing, said fastener means in said locked position being adapted to flex said support plate to conform said pad to the surface of the appliance, and

e. said fastener means including at least one locking member having a base portion and a shaft extending outwardly of the pad assembly and having tab portions adapted to be rotated into locking engagement with the shaver casing.

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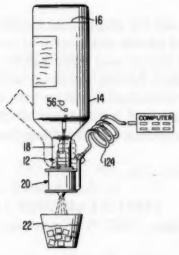
**3,920,149**

## BEVERAGE DISPENSING APPARATUS AND METHOD

**Frank J. Fortino, 645 Scott Blvd., Santa Clara, Calif. 95050, and Robert B. Dodds, 4805 Blueridge, San Jose, Calif. 95129**

**Filed Nov. 23, 1973, Ser. No. 418,485**
**Int. Cl.[2] B67D** *5/30*
**U.S. Cl. 222—1** **47 Claims**



**1.** A liquid dispensing assembly for the outlet of a liquid container comprising: a valve being a tubular body provided with a fluid passage therethrough and means thereon for removably mounting the same on the container at said outlet thereof; a magnetically permeable valve member disposed within said body and movable from a position blocking said passage to a position clearing the same and return; means on said valve for defining a code therefor to identify a characteristic of the container; and a valve actuator having a first coil for generating a magnetic field and a second coil surrounded by the first coil for sensing said code-defining means when said valve is adjacent to said actuator, said valve being movable to a location adjacent to the actuator, said valve member being movable from said blocking position to said clearing position in response to the presence of said magnetic field.

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**3,920,150**

## PAPER CLIP CARTRIDGE

**Kenneth W. Greb, 18 Stanford Drive, Homer, N.Y. 13077**

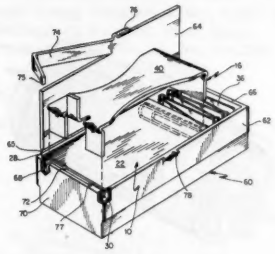
**Filed Nov. 5, 1973, Ser. No. 413,188**
**Int. Cl.[2] B65H** *1/12*
**U.S. Cl. 221—198** **1 Claim**

**1.** A cartridge for supplying a paper clip dispenser with a plurality of paper clips comprising:

an elongated body member adapted to receive a plurality of paper clips therein in a side-by-side relationship, the body member having an opening at one end for exiting paper clips therefrom in the same direction of the side-by-side relationship and having a top wall end at the open one end, the body member having a bottom wall with a slot adjacent the open one end, the top wall has a slot in alignment with the bottom wall slot;

a spring carried by the body member for biasing the paper clips out of the opening of the body member;

a retainer adapted to slide through the slot in the top wall and through the slot in the bottom wall for blocking the open one end to prevent paper clips from exiting therefrom, and the retainer includes integral stop means engageable with one of the top and bottom walls for maintaining the retainer attached to the body member, the retainer being removable from the body member for unblocking the body member opening; and



at least one extension integrally extends from a side wall on the body member beyond the top wall end for providing space to permit paper clips to be advanced out from the body member when the retainer is removed therefrom and to permit paper clips to be pivoted substantially perpendicular relative to the paper clips in the body member whereby the pivoted paper clips may be manually removed from the dispenser.

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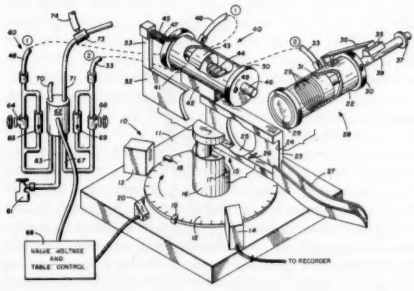
**3,920,151**

**AUTOMATIC SAMPLE CHANGER FOR POSITIONING A PLURALITY OF PELLETS IN AN X-RAY ANALYZER**

**Glenn D. Roe, Dallas, Tex., assignor to Atlantic Richfield Company, Los Angeles, Calif.**

**Filed Jan. 15, 1973, Ser. No. 323,730**
**Int. Cl. B65g** *59/08*
**U.S. Cl. 221—232** **7 Claims**



**1.** Apparatus for sequencing samples comprising:

a sample positioning plate mountable adjacent a base, having a slot along a side adjacent the base and a hole extending to the slot from an opposite side;

a first pneumatic cylinder carried upon said sample positioning plate opening to within the hole therein, in which the samples are loaded, having a piston for sequentially moving the samples through the hole;

a second pneumatic cylinder carried upon said sample positioning plate having a piston therewithin;

ejector means connected to the piston of said second pneumatic cylinder, moveable within the slot at least partially across the hole of said sample positioning plate to eject the sample thereat, along the slot; and

means for controllably applying air pressure to said first and second cylinders.

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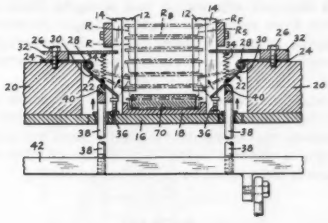
**3,920,152**

**RECEPTACLE UNSTACKING AND TRANSPORTING DEVICE**

**Walter A. Shields, 181-41 Henley Road, Jamaica, N.Y. 11432**

**Filed May 31, 1974, Ser. No. 475,260**
**Int. Cl.² B65G** *59/06*
**U.S. Cl. 221—236** **7 Claims**



**1.** In a device for dispensing and delivering a receptacle to a station to receive an item therein; the improvement comprising upstanding channel members for maintaining receptacles in stacked array; a support bed spaced below the channel members and extending to the item receiving station; receptacle contact members hingedly mounted on opposite sides of the channel members to contact the lowermost receptacle and initially support the receptacles in stacked array; actuator rods reciprocally mounted below the receptacle contact members; springs biasing the receptacle contact members into contact with the actuator rods; means to reciprocate the actuator rods and actuate the receptacle contact members to three positions, the first position to engage the lowermost receptacle and support said lowermost receptacle out of contact with the support bed, the second position to lower said lowermost receptacle and stacked array and position the lowermost receptacle on the support bed, and the third position to engage the next to lowermost receptacle and raise the stacked array from the lowermost receptacle on the support bed; means to advance the lowermost receptacle on the support bed toward the station; and means for guiding and maintaining said advancing receptacle on the support bed.

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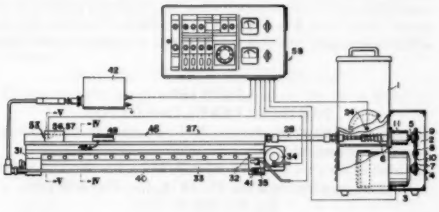
**3,920,153**

**POWDER SPRAYER**

**Shiro Saito, Tokyo, Japan, assignor to Nikka Kabushiki Kaisha, Tokyo, Japan**

**Filed Dec. 23, 1974, Ser. No. 535,167**
**Claims priority, application Japan, Oct. 8, 1974, 49-121536**
**Int. Cl.² B67D** *5/30*
**U.S. Cl. 222—14** **4 Claims**



**1.** A powder sprayer comprising:

a powder storage chamber for storing powder coated with a synthetic resin,

an elongated powder spray chamber for spraying the powder on a material placed therebelow,

a screw conveyer for feeding said powder in said storage chamber to said spray chamber,

a motor for driving said screw conveyer,

a perforated pipe disposed within said spray chamber through which said screw conveyer extends to an open end portion thereof,

a swinging plate provided adjacent and outwardly of the open end of said perforated pipe, said swinging plate being adapted to be displaced by powder fed through and accumulated in said spray chamber,

photoelectric detecting means having a lamp and a photocell disposed adjacent to said swinging plate, the light beam from said lamp directed to said photocell being adapted to be interrupted by the displacement of said swinging plate, and thereby produce an electric signal, and

electrical control means for actuating said screw conveyer driving motor when said light beam from said lamp is received by said photocell and for stopping said driving motor in response to the signal produced when said light beam is interrupted by said swinging plate.

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**3,920,154**

## TONER LEVEL DETECTOR

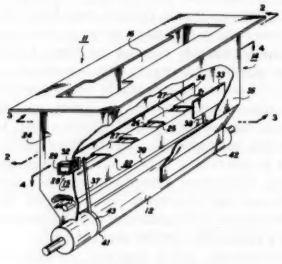
**Kiyoshi Sugawara, Ebina, Japan, assignor to Rank Xerox, Ltd., London, England**

**Filed Mar. 15, 1974, Ser. No. 451,633**

**Claims priority, application Japan, Sept. 5, 1973, 48-103486**

**Int. Cl.[2] B67D** *5/32*; **G01F** *11/00*

**U.S. Cl. 222—23** **9 Claims**



**1.** In a toner dispenser having a reservoir for storing a supply of toner, a detector for sensing impending exhaustion of the toner supply; said detector comprising the combination of a flexible member horizontally bridged between opposed ends of said reservoir to flex downwardly in response to loading thereof by said supply of toner, a pair of substantially vertical baffles disposed on opposite sides of said flexible member for maintaining a space below said member to accomodate downward flexure of said member when said member is loaded with toner, and a switch positioned to be actuated by said member when said supply of toner drops below a predetermined level.

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**3,920,155**

## PARTICLE LEVEL INDICATOR

**Charles A. Whited, Rochester, N.Y., assignor to Xerox Corporation, Stamford, Conn.**

**Division of Ser. No. 357,995, May 7, 1973, Pat. No. 3,834,806. This application Feb. 27, 1974, Ser. No. 446,180**

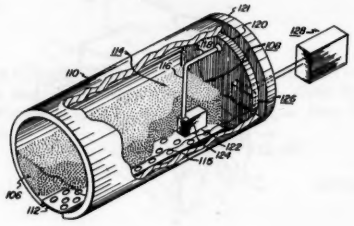
**Int. Cl.[2] B67D** *5/08*

**U.S. Cl. 222—23** **5 Claims**

**1.** An apparatus for indicating particle quantity, including: means for housing a supply of particles, said housing means includes a generally tubular member journaled for oscillatory movement substantially about the longitudinal axis thereof and defining a chamber for storing a quantity of particles therein, said tubular member having a perforated region arranged to prevent the passage of particles therethrough when said tubular member is stationary while allowing the passage of particles therethrough when said tubular member is oscillated;

means for vibrating said housing means to dispense particles therefrom;

means for sensing the level of particles remaining in said housing means, said sensing means being mounted for



movement in said housing means and arranged to engage the particles stored therein above a pre-selected level; and

means for detecting the movement of said sensing means relative to said housing means, said sensing means being adapted to move relative to said housing means when the particles stored therein are beneath the pre-selected level and said vibrating means moves said housing means to dispense particles therefrom.

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**3,920,156**

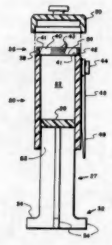
## INCREMENTAL BUTTER DISPENSER

**Leslie E. Hicks, c/o Byron H. Robinough P.O. Box 385, LaPine, Oreg. 97739**

**Filed Feb. 24, 1975, Ser. No. 552,114**

**Int. Cl.[2] B67B** *7/24*

**U.S. Cl. 222—80** **9 Claims**



**1.** A device for incrementally dispensing a spreadable foodstuff comprising:

a. an elongate housing defining a chamber open at both ends and having interior dimensions sufficient to matingly enclose a conventional stick of butter or similar spreadable foodstuff therein;

b. wall means projecting longitudinally from a portion of the perimeter of one of said open ends of said chamber for defining the side of an exterior space having a width greater than the corresponding interior width of said open end of said chamber, said space having an opening in at least one side thereof which is also wider than the corresponding interior width of said open end of said chamber;

c. means for advancing said stick of spreadable foodstuff through said chamber until a predetermined quantity of

said foodstuff protrudes from said chamber into said open-sided space; and

d. spatula means having a blade insertable into said opening, said blade being of a width greater than the corresponding interior width of said chamber, for slicing said quantity of protruding foodstuff from said stick.

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**3,920,157**

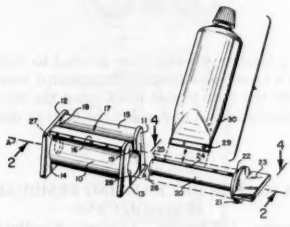
**TUBE SQUEEZING DEVICE**

**Yim-Hei Joseph Yeung, Fountain Valley, Calif., assignor to Joylite Manufacturing Co., Ltd., Hong Kong**

**Filed Oct. 21, 1974, Ser. No. 516,259**

**Int. Cl.[2] B65D** *35/34*

**U.S. Cl. 222—100** **3 Claims**



1. A tube squeezing device comprising, in combination:

a. a molded plastic housing in the form of a hollow cylindrical portion integrally terminating in flat front and rear end walls extending radially outwardly, the lower edges of the end walls being parallel and lying in the same horizontal plane to thereby serve as a stand and support the cylindrical portion with its axis in an horizontal position, upper side walls of the cylindrical portion curving smoothly away from each other to define an elongated receiving aperture running parallel to the axis of the cylindrical portion, said aperture terminating at the rear end wall and opening out through the front end wall; and,

b. a molded plastic turn key in the form of a rigid hollow shaft of diameter between one fourth and three-fourths the inside diameter of said cylindrical portion of said housing integrally terminating at its front end in a flat circular disc means lying in a plane normal to the axis of the shaft, said disc means including an annular step at its periphery, said shaft including a slot in its wall parallel to its axis and extending from said disc means to open out at the rear end of said shaft, said rear end of said shaft having a slight flare in a radially outwardly direction, the rear end wall of said housing defining an opening coaxial with the axis of said cylindrical portion and having a diameter corresponding to the diameter of the main portion of said shaft, the front wall of said housing having an opening coaxial with the axis of said cylindrical portion and of a diameter corresponding to the diameter of said annular step in said disc means, the length of said shaft as measured from the back wall of the annular step on the disc means to the flared end being at least equal to the length of said housing as measured between the exterior surface of the front and rear end walls whereby the end of a tube to be squeezed can be slid into the slot of said shaft and the shaft then passed into the opening in said front wall with the tube passing along said aperture until the flared end of said shaft snaps into the opening of said rear wall and the annular step of said disc means is seated in said opening in said front wall, the rear and front openings defining journalling bearings for the shaft, and whereby turning of the disc means will pull said end of said tube into said aperture the smoothly curved walls defining the aperture compressing the side walls of the tube to cause the contents of the tube to be extruded in a controlled manner.

**3,920,158**

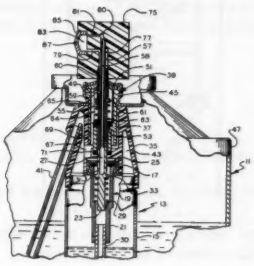
**DUAL DISPENSING VALVE**

**Philip Meshberg, 85 Old Oaks Road, Fairfield, Conn. 06605**

**Filed Nov. 27, 1973, Ser. No. 419,239**

**Int. Cl.[2] B05B** *7/28*

**U.S. Cl. 222—135** **15 Claims**



1. In a dual dispenser aerosol container wherein a first material is stored under pressure with a first container and a second material is stored under pressure within a second container, said first container being precharged before assembly, sealed at its outlet by a first reciprocating valve having an outlet port in a stem protruding therefrom and in connection with said first container being adapted to discharge materials when said stem is pushed in, apparatus to permit simultaneous dispensing of said first and second material comprising, a second reciprocating valve having dual passageways in a second stem, said second valve being mounted with respect to said containers such that its stem projects externally therefrom, said second valve having one passageway abutting the outlet port of the first valve associated with said first container and another passageway adapted to communicate with the material in the second container when said second reciprocating valve is pressed in, said second valve being further adapted to operate said first valve when pressed in, whereby pressing said second valve will cause simultaneous discharge of two materials through the passageways of said second valve stem with no mixing prior to discharge therefrom.

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**3,920,159**

**APPARATUS FOR DISCHARGING AND HEATING AGGREGATE FOR THE MAKING OF CONCRETE**

**Onni Olavi Vaananen, Porttikuja 2 F 68, 00940 Helsinki 94, Finland**

**Filed Mar. 19, 1974, Ser. No. 452,547**

**Claims priority, application Finland, Mar. 20, 1973, 858/73**

**Int. Cl.[2] B67D** *5/62*

**U.S. Cl. 222—146 H** **8 Claims**

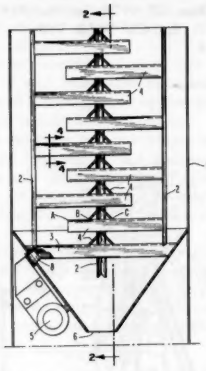
1. Apparatus for discharging aggregate and heating it for the making of concrete, said apparatus comprising:

a vertical silo, through which the aggregate flows downwardly;

an air blower and heater for providing heated air for said silo;

wherein the improvement comprises a plurality of substantially horizontal, mutually crossing chute means, said chute means being mounted at successive vertical positions within said silo, each chute means forming a vaulted

space thereunder, said air being delivered to said chute means and passing through said spaces, at least one of



said chute means terminating in the vicinity of a crossing point with another of said chute means.

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**3,920,160**

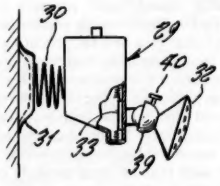
**SHAMPOO DISPENSER**

**Robert Casale, and George Spector, both of 3615 Woolworth Bldg., 233 Broadway, New York, N.Y. 10007**

**Filed Oct. 15, 1973, Ser. No. 406,217**

**Int. Cl.[2] B67D** *5/64*

**U.S. Cl. 222—162** **1 Claim**



1. A shampoo dispenser comprising a case fitted with a removable cover, said case having a rear wall with a projection therefrom having means for attachment to a wall provided on said projection, in combination with a valved outlet at the base of the case said valve having components relatively movable in a vertical plane to effect opening and closing of the outlet wherein said means comprises a suction cup, in further combination with a spring secured to the cup at one end and aligned with the suction cup axis normal to the support wall, said spring being secured at its opposite end to the case, wherein the vertical axis of the case is perpendicular to the said suction cup axis, said valve having a vertical plate adjacent a vertical wall of the case and in sliding abuttment therewith, both plate and vertical wall perforations generally aligned to form the case outlet and further including resilient means securing said plate movably in said case whereby said resilient means biases said plate to a normally closed position wherein the perforations are not aligned and whereby vibrational movement of the case relative to the suction cup will cause oscillatory movement of said plate to periodic positions wherein said perforations are in alignment.

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**3,920,161**

**GUIDED DISPENSER AND APPLICATOR FOR LIQUID VEGETATION EXTERMINATION**

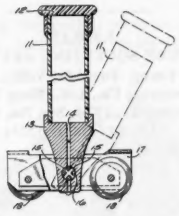
**Walter M. Kenzian, 8024 W. North Ave., Wauwatosa, Wis. 53213**

**Filed Oct. 15, 1974, Ser. No. 514,905**

**Int. Cl.[2] A01C** *15/00*

**U.S. Cl. 222—176** **2 Claims**

1. A guided liquid dispenser and applicator including a tubular handle and reservoir for chemical vegetation extermination fluids, a vented cap fixed to the upper end of said handle, a block element fixed to the lower end of the handle having a vertical bore therein communicating with the handle



reservoir, a tandem wheeled base pivoted to said block element, and a cross valve fixed in the wheeled base which will register with the bore in said block when the handle is tilted in either direction thus dispensing the fluid as desired.

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**3,920,162**

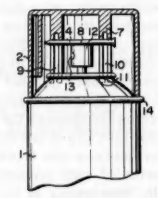
**APPARATUS FOR DISCHARGING RESIDUAL GAS IN AEROSOL CANS**

**Eiichi Kimura, 198-banchi, 3-chome, Kamifukushimakita, Fukushimaku, Osaka, Japan**

**Filed July 17, 1974, Ser. No. 489,457**

**Int. Cl.[2] B65D** *83/14*

**U.S. Cl. 222—182** **5 Claims**



1. An apparatus for the discharging of residual gas in a used aerosol can including a cap and an ejection button with a top surface comprising:

a cylindrical extension of the cap extending inside the cap such that when the cap is mounted on the can, said cylindrical extension encloses the ejection button;

first and second slotted grooves in said cylindrical extension which, when the cap is mounted, extend from the bottom of said cylindrical extension to a position below the top surface of the ejection button in the normal fully extended position of the ejection button; and

a push-rod which, when inserted in said first and second slotted grooves, engages the top surface of the ejection button, and when the cap is mounted and secured on the can, automatically depresses the ejection button causing release of residual gas.

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**3,920,163**

**BEVERAGE DISPENSER WITH IN-BOWL WHIPPER**

**Merle S. Brown, Cohasset, Mass., assignor to Jet Spray Cooler, Inc., Waltham, Mass.**

**Filed July 11, 1973, Ser. No. 378,210**

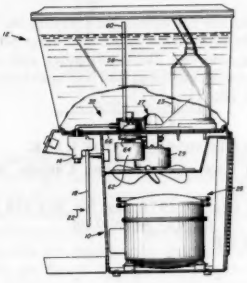
**Int. Cl.[2] B67D** *1/08*

**U.S. Cl. 222—190** **9 Claims**

1. A beverage dispenser comprising

a base and a bowl mounted on the base for containing the beverage to be discharged by the dispenser,

a spigot connected to the bowl through which the bowl contents may be discharged,
a valve operatively associated with the spigot for opening and closing it to control the flow of beverage from the bowl,
a whipper assembly within the bowl and intended to be immersed in the beverage in the bowl,
means for enabling introduction of gas into said assembly on activation of said whipper assembly,
said assembly including a housing having an inlet opening for enabling beverage in the bowl to enter,
an impeller in the housing,



and an outlet passage in the housing connected to the spigot for discharging the whipped beverage,
means including a motor in the base operatively connected to the impeller for rotating the impeller to activate the whipper assembly,
means operatively connecting the valve and the motor causing the motor to activate the whipper when the valve is open and deenergize the whipper when the valve is closed,
and means mounted in said bowl, independent of said whipper assembly for circulating said beverage in said bowl.

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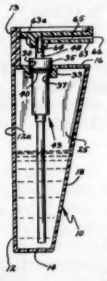
**3,920,164**
**LIQUID DISPENSING STRUCTURE**
**Ogden D. Lindsoe, 3209 Dana Drive, Burnsville, Minn. 55337**
**Filed Dec. 9, 1974, Ser. No. 530,698**
**Int. Cl.² B67D** *5/50*
**U.S. Cl. 222—385** **1 Claim**



1. A wall mountable liquid dispensing device, comprising
a housing having a chamber therein,
said housing having a flat vertical back wall and a horizontal top wall,
an adhesive coating overlying the outer surface of said back wall,
said back wall being secured to a wall surface
a portion of said back wall extending above said top wall,
said top wall having an opening therein,
a pump disposed through said opening of said top wall and being seated therein,
a plate member overlying said top wall mounted thereabove onto an upper portion of said pump forming a pump actuating member,
said upwardly extending portion of said back wall having a vertical rib therein,
said plate member having a groove therein receiving said rib, and
said plate member having an upstanding rim portion about the side and front walls thereof forming a receptacle.

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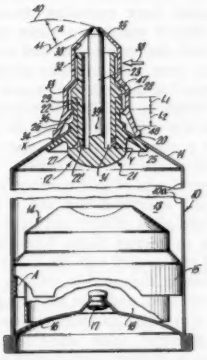
**3,920,165**
**AUTOMATIC TIP-SEAL VALVE**
**Robert S. Schultz, 7 Heusted Drive, Old Greenwich, Conn. 06870**
**Filed Aug. 16, 1974, Ser. No. 498,135**
**Int. Cl.² B65D** *83/14*
**U.S. Cl. 222—402.23** **19 Claims**



1. In combination, for use as an automatic tip-seal valve for a pressurized container, a rigid centrally apertured container-closure member, an elastomeric bushing fitted to said member and having a reduced portion extending through the aperture, said bushing having a lower radial flange beneath and retained by said closure member, and an upper radial flange at a location above said closure member, said bushing having a longitudinal bore extending axially through the aperture region of the closure member; a valve member having a lower radial flange normally seated in axial abutment with said bushing and including a dispensing stem with an outer annular body portion fitted to and extending through and beyond the outer end of the bore of the bushing, said stem including an upper radial flange in overlapping adjacency with the upper radial flange of said bushing, said stem further comprising a pin portion projecting axially beyond the end of said body portion, and said body portion being apertured to permit valve-admitted container contents to flow into the inner volume of said body portion and into surrounding relation to said pin portion; and a closure cap having a centrally apertured end and a skirt surrounding exposed parts of both said stem and said bushing, said skirt having an internal flange engaging the underside of the upper flange of said bushing and having a lower peripheral edge in circumferential abutment with said container-closure member, said bushing via its upper flange normally resiliently loading the lower peripheral edge of said skirt into such circumferential abutment for a valve-seated coaxial relation of said valve member and container-member aperture that said

pin registers with and closes the cap aperture when the parts are in said valve-seated relation; whereby upon application of a tilting lateral displacement force to the upper end of said cap with respect to the container-member aperture, the skirt contact with the container-closure member changes from circumferential to essentially a localized single-point fulcrum contact at a first radial offset from the container-member aperture and the lower valve-member flange derives a localized fulcrum contact with said bushing at a second radial offset diametrically opposed to said first offset, as the upper bushing flange is compressed between said body-portion and skirt flanges and as the reduced portion of said bushing elastically stretches between flanges thereof, so that the combined offsets effectively add to produce rapid opening of the pin-to-cap closure while the valve member opens to admit product for dispensing, and so that the parts return to their valve-closed coaxial relation to the container-end aperture upon release of the lateral displacement force, the tip seal being automatically closed at the same time.

**16.** (Amended) In combination, for use in a container of liquid product, a rigid centrally apertured container closure member having inner and outer sides, an elastomeric bushing in axially-retaining fitted relation to said member and extending through the aperture and between inner and outer sides, said bushing including upper and lower radial flanges on opposite sides of the aperture and said bushing having a central longitudinal bore extending through the aperture region of the closure member, a valve member seated in axial abutment with the inner end of said bushing and including a dispensing stem with an outer annular body portion fitted to and extending through and beyond the outer end of the bore of the bushing, said stem further comprising (a) an elongate pin portion extending beyond the axially outer end of said annular portion and (b) an upper flange formation having upwardly retained engagement with the upper side of the upper flange of said bushing, and a closure cap having a centrally apertured end and a skirt surrounding outwardly exposed parts of both said stem and said bushing, said cap having an internal flange formation having downwardly retained engagement with the lower side of the upper flange of said bushing, the cap skirt abutting the closure member when thus retained, and said pin being so formed as to coact with and close the cap aperture when the cap skirt is thus retained; whereby, upon tilting the cap, said cap is caused to relieve itself from contact with said closure member and to effectively open the cap-end aperture as the valve-member seat engagement is relieved at the lower end of said bushing and as the upper flange of said bushing is resiliently squeezed by and between said flange formations.

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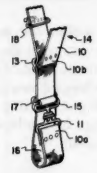
## 3,920,166
## SKI-CARRIER STRAP DEVICE

**Philip C. Hogensen, Jr., 1924 Wagstaff Drive, Salt Lake City, Utah 84117**

**Division of Ser. No. 367,446, June 6, 1973, Pat. No. 3,841,542. This application Aug. 5, 1974, Ser. No. 494,532**
**Int. Cl.[2] B65D** *71/00;* **A45F** *4/00*
**U.S. Cl. 224—5 Z** **2 Claims**

**1.** A strap device convertible from a waist belt to a ski-carrier and vice versa, comprising a single strap continuous in length from one end to the other; a pair of mating buckle members with one buckle member thereof attached to one end portion of said strap; two length adjustment slide means attached to said strap for sliding positional adjustment along the length thereof; means attaching the other end portion of said strap to said slide means nearest that end to form a first loop of adjustable size; the second buckle member of said pair being positioned with the other of said slide means for movement with at least a part thereof therewith, said one buckle member being adapted to releasably engage said second buckle member to form a second loop of adjustable size; and a third buckle member adapted to mate with said one buckle member and being slidably attached to said strap within the extent of the first loop for sliding movement thereon, said device being capable of use as a ski-carrier by forming one of said loops around a pair of skis, which are positioned together in parallel relationship as a unitary bundle, and to present the




other loop as a handle for lifting and carrying the ski bundle, and said device being capable of use as a waist belt thereafter by disconnecting said one buckle member and said second buckle member and by engaging said one buckle member with said third buckle member.

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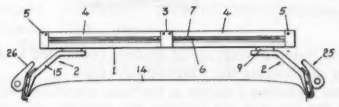
## 3,920,167
## AUTOMOBILE ROOF RACK

**Ronald William Parsons, Tottenham, Canada, assignors to AL & W Sports**

**Filed Oct. 17, 1974, Ser. No. 515,575**
**Int. Cl.[2] B60N** *9/08*
**U.S. Cl. 224—42.1 F** **4 Claims**




**1.** A roof rack for mounting on the roof of an automobile having a rain gutter along each lateral side of the roof, said rack comprising a transverse member terminating in downwardly extending struts, each strut having an edge engageable in the rain gutter, a clip having a lower inturned elbow adapted to engage the underside of the rain gutter, and an upper inturned portion slidable against the downwardly extending strut, a manually operated cam, and means supporting the cam from the strut and retaining the clip between the cam and the strut, the cam being rotatable upon said support means to press the clip towards the strut and cause the clip to slide up the strut, thus drawing the elbow under the rain gutter and clamping the strut in the gutter.

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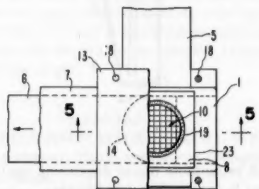
## 3,920,168
## APPARATUS FOR BREAKING SEMICONDUCTOR WAFERS

**Barrie F. Regan, 1760 Manor Drive, Hillsborough, Calif. 94010; Glen B. Regan, 1451 Beach Park Blvd. No. 203, Foster City, Calif. 94404, and Brent F. Regan, 1760 Manor Drive, Hillsborough, Calif. 94010**

**Filed Jan. 15, 1975, Ser. No. 541,152**
**Int. Cl.[2] B26F** *3/00*
**U.S. Cl. 225—103** **3 Claims**

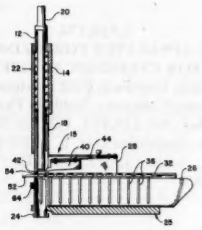



**2.** Apparatus as defined in claim **1** having a thin pressure-expandable resilient sheet covering the opening in the rectangular carrier.

## 3,920,169
## DRIVING TOOL MECHANISM

Charles J. DeCaro, Brighton Township, Allegheny County, Pa., assignor to Textron Inc., Providence, R.I.

Continuation-in-part of Ser. No. 397,998, Sept. 17, 1973, abandoned. This application Aug. 22, 1974, Ser. No. 499,642
Int. Cl.[2] B25C *1/00*
U.S. Cl. 227—136 15 Claims



1. A mechanism for feeding a strip of metal fasteners to an impact tool having a reciprocable piston for driving the fasteners through an impact stroke into a workpiece comprising:

A. a barrel including an exit means extending through a wall thereof for attachment to the impact tool;

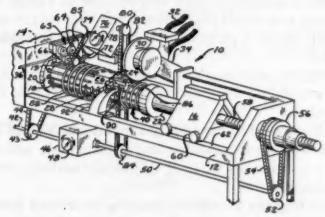
B. a magazine for holding the strip and disposed with respect to the barrel to feed the strip into the barrel in driving position with respect to the piston; and

C. a bushing disposed and secured within an end of the barrel and having an end positioned with respect to the strip to retainably engage edges of the strip between the bushing and the barrel wall adjacent the exit means during the impact stroke of the piston to permit separation of the fastener from the edges of the strip and to disengage from the strip after impact to permit advancement of the strip into the barrel and through the exit means.

## 3,920,170
## APPARATUS FOR MAKING CYLINDRICAL SCREENS

Edward N. Colburn, and Reinhold S. Markfelt, both of Minneapolis, Minn., assignors to Universal Oil Products Company, Des Plaines, Ill.

Division of Ser. No. 344,460, March 23, 1973, Pat. No. 3,875,977. This application Oct. 24, 1974, Ser. No. 517,560
Int. Cl.[2] B23K *31/00*, *11/06*; B21F *15/08*
U.S. Cl. 228—5.1 2 Claims

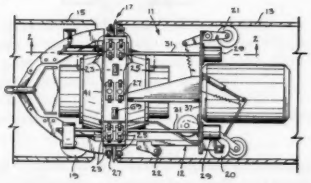


1. In a cylindrical welded screen making apparatus of the type having a rotating weld head, a welding roller, and a carriage for rotating and longitudinally advancing a plurality of rods as a wire is helically wrapped around them and welded to them, the improvement comprising a set of preforming rollers for feeding said wire, said preforming rollers being positioned close to said rods but axially spaced from said welding roller so that said wire is loosely coiled through at least one revolution about said rods between said preforming rollers and said welding rollers, at least one of said preforming rollers being powered, and means for adjusting the rate of feed of said wire by said preforming rollers so that the size of the coil of wire can be maintained at approximately a predetermined size.

## 3,920,171
## APPARATUS FOR POSITIONING AND CLAMPING PIPES FOR WELDING

Edward A. Clavin, Houston, Tex., assignor to CRC-Crose International, Inc., Houston, Tex.

Filed Feb. 1, 1974, Ser. No. 438,646
Int. Cl.[2] B23Q *3/14*
U.S. Cl. 228—44 7 Claims



1. An apparatus for aligning pipe, comprising:

a housing, said housing of suitable size to fit wholly within a pipe;

means for positioning the ends of a first and a second pipe into abutment;

means for clamping said first and second pipes in aligned abuttent while the adjacent ends of said first and second pipes are welded together;

means for spacing the ends of said first and second pipe by a preselected distance when said pipes are positioned in aligned abutment;

said positioning means including

a rod, said rod supported by said housing within said first and second pipes, said rod being positioned parallel to the axis of said first pipe in which the housing is located, said rod extending to a position within said second pipe;

a means for gripping said second pipe, said gripping means connected to said rod, said gripping means adapted to expand from a position within said second pipe to engage securely the interior of said second pipe responsive to lateral displacement of said rod in a direction toward said first pipe, said gripping means adapted to displace said second pipe toward said first pipe responsive to further lateral displacement of said rod in a direction toward said first pipe after said gripping means has securely engaged said second pipe;

an actuator, said actuator causing said rod to be displaced along a line parallel to the axis of said first and second pipes;

said gripping means including

a shoe for contacting the interior of said second pipe, said shoe having a supporting cylinder thereon;

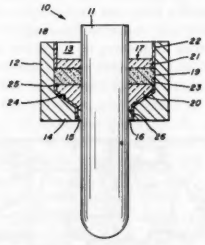
a lever, said lever connected pivotally to said rod and pivotally to said shoe, said lever having a pin thereon between the connection of said rod and said shoe, said pin serving as a fulcrum for said lever; and

a slotted guide, said guide connected to said housing, said guide adapted for receiving the pin on said lever and guiding said pin responsive to displacement of said rod in a direction toward said first pipe causing the lever to pivot about the pin such that the shoe assembly contacts securely the interior of the second pipe, thereafter causing the shoe to displace said second pipe in a direction toward said first pipe.

## 3,920,172
## CONDUCTIVE GLASS SEAL ASSEMBLY

**Seong K. Rhee, Livonia, Mich., assignor to The Bendix Corporation, Southfield, Mich.**

**Filed Oct. 3, 1974, Ser. No. 511,854**
**Int. Cl.[2] C03C** *27/02*
**U.S. Cl. 228—124** **8 Claims**



**1.** A process for making a hermetic ceramic to metal electrically conductive glass seal assembly comprising:

a. disposing a layer of glass between a metal member and a ceramic member;

b. disposing a layer of conductive glass atop the layer of glass;

c. disposing a layer of glass atop the layer of conductive glass;

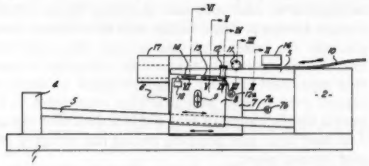
d. heating the glass layers at an elevated temperature to soften the glass; and

e. applying pressure to the softened glass to densify and compact the layers.

## 3,920,173
## METHOD AND MACHINE FOR MANUFACTURING SHAPED PARTS FROM FLAT SHEET METAL

**Dario Salata, Rapallo, Italy, assignor to Retmeca S.A., Fribourg, Switzerland**

**Filed Apr. 19, 1973, Ser. No. 352,491**
**Claims priority, application Switzerland, Apr. 24, 1972, 6050/72**
**Int. Cl. B23k** *31/02*; **B21k** *29/00*
**U.S. Cl. 228—147** **15 Claims**



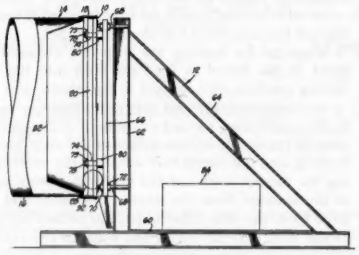
**1.** A method of manufacturing from a strip of flat sheet metal a shaped elongated part having a progressively varying cross section, comprising: displacing said strip along a generatrix of a fixed shaping mandrel the cross section of which decreases progressively along said generatrix in a predetermined manner, and progressively bending said strip as it is displaced around said mandrel on either side of said generatrix so as to follow the shape and dimensions of said mandrel, by pressure means the point of action of which is variable along said mandrel to produce a desired variation in the cross section of the part to be shaped.

**8.** A machine for manufacturing from a strip of flat sheet metal a shaped elongated part, comprising: a frame, a shaping mandrel mounted on said frame and having a cross section decreasing progressively in one direction at least one shaping head movable parallel to a generatrix of said mandrel, at least one pair of shaping rollers and associated actuating means supported by said head for urging said strip against said shaping mandrel on either side of said generatrix, first drive means for displacing said strip at a uniform speed along said generatrix, and second drive means for displacing said shaping head with respect to said mandrel for producing the desired variation in cross section of said part.

## 3,920,174
## METHOD AND APPARATUS FOR SIZING JOINT RINGS FOR CYLINDRICAL PIPES

**Homer C. Lamborn, Glendora, Calif., assignor to United States Pipe and Foundry Company, Baldwin Park, Calif.**

**Division of Ser. No. 229,907, Feb. 28, 1972, Pat. No. 3,783,671. This application Dec. 6, 1973, Ser. No. 422,312**
**Int. Cl.[2] B23K** *13/02*
**U.S. Cl. 228—155** **5 Claims**



**1.** A method of sizing metal joint rings for cylindrical pipe, wherein the steps comprise

initially expanding a joint ring beyond its elastic limit,

stopping said initial expansion of the joint ring to expand the joint ring to a particular size selectably less than its final size,

welding the joint ring to the end of the cylindrical pipe, and

re-expanding the joint ring beyond its elastic limit to its final size.

**4.** A method of re-expanding a metal joint end of a cylindrical pipe with an expandable and contractable unitary C-ring having a continuous exterior cylindrical surface, wherein the steps comprise

contracting the C-ring by applying an inward force thereto to reduce the normal diameter of the C-ring,

mounting the C-ring within a cylindrical joint end, having already been initially expanded, of a cylindrical pipe with the axis of the C-ring axially aligned with the axis of the joint end and pipe,

allowing the C-ring to expand toward its normal diameter thereby causing the exterior surface of the C-ring to engage the inner circumference of the joint end and distribute a substantially uniform radially outward force against the inner circumference of the joint end, and

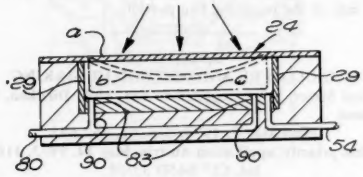
expanding the C-ring by a predetermined amount by applying outward force thereto to increase the C-ring to its normal diameter to thereby re-expand the joint end beyond its elastic limit to complete re-expansion of the joint end.

3,920,175

## METHOD FOR SUPERPLASTIC FORMING OF METALS WITH CONCURRENT DIFFUSION BONDING

Charles Howard Hamilton, San Pedro, and Leonard A. Ascani, Jr., Palos Verdes Estates, both of Calif., assignors to Rockwell International Corporation, El Segundo, Calif.

Filed Oct. 3, 1974, Ser. No. 511,900
Int. Cl. B23k 31/00
U.S. Cl. 228—173 20 Claims




1. A method of making a metallic structure from a plurality of workpieces comprising:

providing at least one shaping member;

providing a metal blank workpiece having an effective strain rate sensitivity and two opposed principal surfaces;

providing at least one metal workpiece to be bonded to said metal blank;

enclosing an area around said metal blank, said at least one shaping member, and said at least one metal workpiece;

heating said metal blank and said at least one metal workpiece to a temperature suitable for forming said metal blank and sufficient to produce bonding of said metal blank to said at least one metal workpiece under coordinated temperature-pressure-time duration conditions;

inducing tensile stress in said metal blank by applying a pressure loading across said principal surfaces thereof, causing said metal blank to deform against, and into intimate contact with said at least one shaping member and said at least one metal workpiece; and

maintaining said pressure loading and said temperature for a time duration sufficient to produce bonding between said metal blank workpiece and said at least one metal workpiece.

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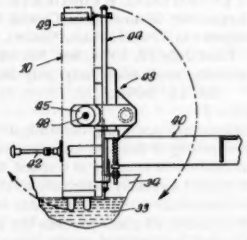
3,920,176

## SOLDER METHOD

John E. Becker, and Adolph E. Schultz, both of Evansville, Ind., assignors to Whirlpool Corporation, Benton Harbor, Mich.

Filed Sept. 9, 1974, Ser. No. 504,430
Int. Cl.² B23K 1/08, 1/06
U.S. Cl. 228—183 16 Claims




1. The method of soldering a metal tubular element having an outer portion and an inner end portion to a metal female element receiving said end portion and defining a distal annular solder space in said female element about said end portion, said method comprising the steps of: coaxially securing said end portion into said female element with said outer portion disposed outwardly thereof; immersing the secured end portion in a molten solder bath with said space opening downwardly to apply a coating of molten solder to said tubular element and into said solder space; withdrawing the molten solder coated tubular element from the bath and, prior to solidifying of said solder on said tubular element inverting the same to dispose said space to open upwardly and allow molten solder on said tubular element to run into and fill voids in said solder space and to form a fillet at the upper end of said solder space; and setting the solder.

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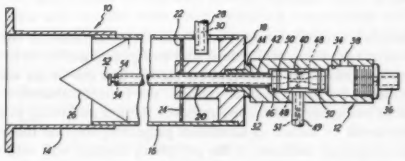
3,920,177

## HOT WORKING OF ENCLOSURES

Stanley George Wilson, Frodsham, and Norman Wilson Smith, Hoylake, both of England, assignors to John Kerr & Co. (Manchester) Limited, Liverpool, England

Filed Sept. 19, 1973, Ser. No. 398,921
Claims priority, application United Kingdom, Sept. 26, 1972, 44304/72
Int. Cl.² B23K 35/38
U.S. Cl. 228—218 4 Claims




1. A method of preventing the explosive ignition or flaming of vapors during hot work, such as welding, on enclosures, such as metal tanks, comprising the steps of filling all of the available space within said enclosure with a high expansion fire-fighting foam, gasified with an inert gas, and then passing said foam continuously through said enclosure in quantities sufficient to ensure that said enclosure maintains said filled condition while said hot work is performed.

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3,920,178

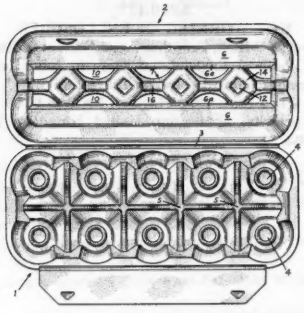
## PACKAGE FOR FRAGILE OBJECTS

Bent Moller, Vaerlose, Denmark, assignor to Aktieselskabet Brodrene Hartmann, Lyngby, Denmark

Filed Sept. 12, 1973, Ser. No. 396,465
Claims priority, application Germany, Sept. 14, 1972, 2245176
Int. Cl.² B65D 1/00, 81/16, 85/32
U.S. Cl. 229—2.5 1 Claim

1. Article revealing carton for fragile objects, particularly eggs, comprising a container section with a cover section hinged thereto, said container section having a plurality of article receiving compartments arranged in at least two parallel rows and also upwardly extending projections located between said rows of compartments, said cover section having at least two upwardly projecting gable portions extending

parallel with the rows of compartments and a lower cover section located between two neighboring gable portions and interconnecting the lowermost edges of the opposed sides of the neighboring gable portions, a number of apertures being provided corresponding to the compartments in the container section, said apertures being formed in the lower cover section and the sides of the gable portions adjoining thereto, and being arranged so as to coincide with the respective compartments in the container section when the cover section is closed thereon, the upwardly extending projections of the container section having upwardly facing abutment surfaces at the free ends thereof, the lower cover section of the cover section being provided with a number of counter-abutment



surfaces corresponding to the abutment surfaces of the upwardly extending projections and being arranged so as to abut against said latter abutment surfaces when the cover section is closed on the container section, the counter-abutment surfaces being parts of the lower cover section and being integral therewith by means of shoulders projecting beyond the counter-abutment surfaces at the periphery thereof and with their inner surfaces bordering the counter-abutment surfaces, at least parts of the outer surfaces of the shoulders extending along at least a part of the edges of the apertures in the lower cover section, the shoulders having a channel-like cross section thus defining upwardly open channels in the upper surface of the lower cover section.

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**3,920,179**

**DISPOSABLE VOMITING BAG**

**Kenneth F. Hall, 9205 W. 73rd Place, Arvada, Colo. 80005**

**Filed Dec. 17, 1973, Ser. No. 425,512**

**Int. Cl.[2] B65D** *33/28*

**U.S. Cl. 229—63** **9 Claims**

1. A disposable vomiting bag comprising:

a rigid support portion having an inlet opening and a hand grip;

a receiving bag portion supported from the support portion in receiving relation to the inlet opening and having a closed end; and

an inner partition portion extending into the inside of the receiving bag portion and narrowing toward the closed end to provide a funnel-like channel terminating in an inner opening of a size substantially smaller than said inlet opening, said partition portion having a closure member operatively associated with said inner opening and manipulated by closing forces applied at an outer side of the bag portion between the inlet opening and the closed end to selectively close off said inner opening to prevent the emission of odors from the receiving bag portion after use said closure member having a portion extending through a side of the receiving bag portion.

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**3,920,180**

**BAG CLOSURE AND METHOD OF MAKING**

**Gottfried Meier, Schoemeggstrasse 141, 8953 Dietikon, Switzerland**

**Filed May 7, 1974, Ser. No. 467,643**

**Claims priority, application Austria, May 14, 1973, 4186/73**

**Int. Cl.[2] B65D** *33/28*

**U.S. Cl. 229—63** **15 Claims**

1. In a closure for the mouth of a bag or the like; superposed endless strips of flexible material joined along the edges and forming an endless tubular seam, flexible means extending along the seam adapted when the effective length thereof in the seam is reduced to reduce the diameter of the closure, a row of elongated apertures in each said strip in uniformly spaced relation along the length of the strip, the apertures in one strip being displaced longitudinally a distance of about one-half the pitch of the apertures from the apertures in the other strip, reduction in the diameter of said closure by drawing up said flexible means causing folding of said seam in the region of each aperture, said flexible means emerging from a said aperture when the seam folds in the region of the aperture.

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**3,920,181**

**CENTRIFUGAL HYDROEXTRACTOR**

**Berlando Lega, and Giannangiolo Cecchi, both of Florence, Italy, assignors to Texfluid S.a.s.(Entire), Florence, Italy**

**Filed July 10, 1974, Ser. No. 487,254**

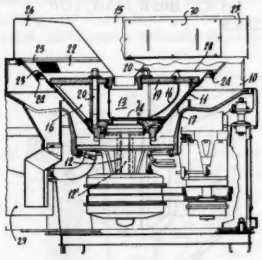
**Claims priority, application Italy, July 26, 1973, 27124**

**Int. Cl.[2] B04B** *1/20, 15/06, 11/06*

**U.S. Cl. 233—2** **12 Claims**

1. A continuously operating centrifugal hydroextractor of the type comprising a frustum cone rotating basket, and a mechanical distributor rotating at a speed different to that of the basket, placed coaxially internally to this latter, the said mechanical distributor comprising blades to guide the material from a central feed-point towards the peripheral surface of the said basket, and at least one disc placed perpendicularly to the axis of rotation of the basket, rotating fixedly to the said blades, the said disc having openings on its peripheral edge for the exit of the material, with each opening angularly spaced from the edge of the relative blade, said disc defining with the

internal surface of the basket, an annular gap for the passage of the centrifuged liquid, and that the said basket has on the



top a perforated filtering band, the said disc being below the perforated band.

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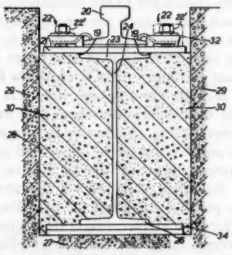
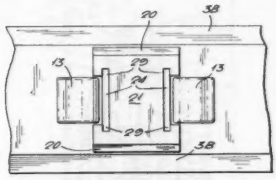
**3,920,182**
**HEAVY DUTY RAIL TRACK ASSEMBLIES**
**George Molyneux, Eastbrook Road, Gloucester, England**
**Filed Nov. 23, 1973, Ser. No. 418,207**
**Int. Cl.² E01B** *3/12*
**U.S. Cl. 238—25** **1 Claim**



1. A heavy duty rail assembly comprising a longitudinal composite beam supported on foundation means, the said longitudinal composite beam including a steel beam embedded in and extending longitudinally of a concrete beam and the said steel beam having upper horizontal longitudinal flange means the top surface of which is exposed and disposed above the concrete, the said assembly also including a longitudinal metal rail mounted on and substantially narrower than said top surface of the said steel beam and laterally adjustably located on said top surface by means of a series of anchorage devices located at spaced intervals along both opposite edges of the said metal rail, the said anchorage devices being attached directly to said upper horizontal flange means of the steel beam, said beam including structural steel work extending down from said flange means to the lower surface of the beam to transmit load on said rail through said beam to said foundation means.

**3,920,183**
**PAD FOR POSITIONING UNDER A RAILWAY RAIL AND AN ASSEMBLY INCLUDING THE PAD**
**William George Houghton, Winchester, England, assignor to Pandrol Limited, London, England**
**Filed June 20, 1974, Ser. No. 481,402**
**Claims priority, application United Kingdom, June 21, 1973, 29613/73**
**Int. Cl.² E01B** *9/68*
**U.S. Cl. 238—283** **10 Claims**



1. A pad for interposition between the bottom of a railway rail and rail foundation upon which the rail stands, the pad comprising a single piece of elastomeric material in the form of a substantially rectangular sheet comprising an upper major face, a lower major face, portions defining two substantially rectangular recesses extending right through the pad substantially at the centers of first and second opposite sides of the pad, first and second walls each extending transversely with respect to said major faces and providing third and fourth opposite sides of the pad, and first and second sloping surfaces extending from respective ones of said walls to said upper major face, each of said sloping surfaces having a gradient substantially less than that of the wall from which it extends.

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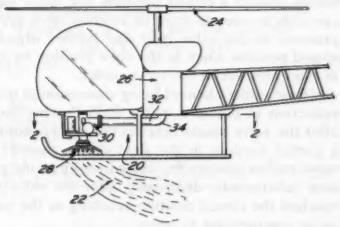
**3,920,184**
**HYDRAULIC PLANTING METHODS AND APPARATUS**
**John E. Waldrum, Ambler, Pa., assignor to Amchem Products, Inc., Ambler, Pa.**
**Filed Dec. 7, 1973, Ser. No. 422,817**
**Int. Cl.² A01C** *1/00;* **B05B** *17/02;* **B64D** *1/18;* **B01F** *3/14*
**U.S. Cl. 239—10** **62 Claims**

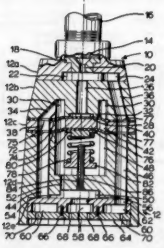


1. A method for depositing agricultural seeds in a well defined pattern in an area on the ground from above the ground comprising steps of providing a mixture of said seeds and a viscous, elastic carrier fluid, spraying said mixture in the air substantially above said area while traversing said area, said carrier fluid entraining the seeds in order to preclude them from segregating and drifting widely as said particles drop to the ground such that said particles are deposited generally evenly over said area.

## 3,920,185
## FLUID OSCILLATOR WITH FEEDBACK AND PULSATING SHOWER HEAD EMPLOYING SAME

Clyde C. K. Kwok, Montreal, Canada, assignor to Edward V. Rippingille, Jr., Key Largo, Fla.

Filed Aug. 29, 1974, Ser. No. 501,735
Int. Cl.[2] B05B 3/14
U.S. Cl. 239—102 19 Claims



1. A fluid oscillator for producing pulsations in a flow of fluid comprising:

a. a housing defining a fluid inlet channel adapted to be connected to a supply of fluid under pressure and a fluid outlet channel for flow of fluid through the housing;

b. valve means positioned between the fluid inlet channel and the fluid outlet channel for controlling the flow of fluid between the fluid inlet channel and the fluid outlet channel, the valve means being operable by fluid pressure alternately to open and to close and thereby respectively to permit and to prevent fluid from flowing through the fluid outlet channel;

c. the valve means including a valve inlet communicating with the fluid inlet channel, a valve outlet communicating with the fluid outlet channel and means to bias the valve means toward a closed position, the valve means being operable to open to an open position upon applying fluid pressure to the valve inlet and further urged toward a closed position when in the open position by a reduction in fluid pressure at the valve outlet;

d. the fluid outlet channel being dimensioned to produce a reduction in pressure in the fluid flowing therethrough after the valve means reaches the open position and also a partial vacuum in the field outlet channel when the valve means reaches the closed position, the partial vacuum substantially dissipating after the valve means has reached the closed position resulting in the valve means again commencing to open;

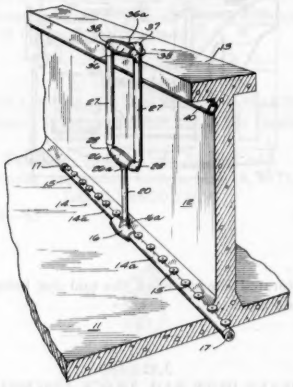
e. the housing defining a feedback channel communicating with valve means and with the fluid flowing through the housing, so that a variation in the fluid supply pressure tending to vary the position of the valve means causes a corresponding variation in pressure in the feedback channel tending to substantially offset any variation in the position of the valve means; and

f. the valve means including separating means defining a valve chamber adjacent to the feedback channel, the separating means being positioned so that fluid entering the feedback channel is prevented by the separating means from entering said valve chamber.

## 3,920,186
## SWING PIPE ASSEMBLY FOR REMOVABLE GAS DIFFUSER

Robert E. Crandall, Greendale, Wis., assignor to Envirex Inc., Waukesha, Wis.

Filed Aug. 12, 1974, Ser. No. 496,573
Int. Cl.[2] B05B 15/08, 1/20
U.S. Cl. 239—280.5 5 Claims



1. In a swing joint gas supply line for supporting a diffuser head in a tank containing the liquid in which the gas is to be diffused, a first tee having a relatively rotatable elbow at each end and a lateral adapted to be connected to a gas supply line so that the elbows are rotatable about a fixed horizontal axis parallel to the header, two parallel pipes having corresponding ends respectively connected to said elbows, a second tee having relatively rotatably elbows at its ends, said elbows being respectively connected to the corresponding other ends of said pipes, each end of each tee having a cylindrical bore, the two bores of each tee having the same axis, the end faces of the tee at the respective ends of said bores being parallel and normal to said axis, one end of each elbow forming a pipe connection and the other end being cylindrical and rotatably fitting within the bore of the corresponding end of the tee, each elbow further having an annular face immediate to the one end thereof and normal to the other end and adapted to engage the corresponding end face of the tee, a single pipe connecting the lateral of said second tee and the diffuser header, said two parallel pipes and the two elbows connected to each thereof forming identical rigid structures, each of said elbows and corresponding tees being assembled so that their respective annular faces are in axial bearing engagement, and a tie rod connecting the two elbows of each tee and securing said faces in bearing engagement whereby the header is firmly held parallel to said fixed axis while being raised to an upper position above the liquid for serving and lowered to its position in the tank for operation, said tie rod extending along the axis of the bores of each tee and concentrically respecting the annular faces in bearing engagement.

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## 3,920,187
## SPRAY HEAD

Robin Burke Willis, Corpus Christi, Tex., assignor to Porta-Test Manufacturing Ltd., Edmonton, Canada

Filed May 24, 1974, Ser. No. 472,970
Int. Cl.[2] B05B 1/02, 1/34
U.S. Cl. 239—400 2 Claims

1. A spray head comprising:

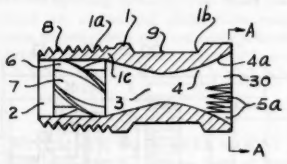
a nozzle section and a driver section connected together;

said nozzle section having a bore formed therethrough of substantially circular cross-section, said nozzle bore hav-

ing an inlet and an outlet, the outlet end of said nozzle bore being outwardly flared;

said driver section having a bore formed therethrough, said driver bore having an inlet and outlet, said driver section outlet communicating with the nozzle section inlet;

means associated with the driver section for forming liquid and moving said liquid through the driver bore and into the nozzle bore, into a helically flowing annular sheet; and




a plurality of members associated with the nozzle section and disposed in a circumferential row at the outlet of the nozzle bore, said members projecting inwardly from the bore surface, each said member having a deflecting face, parallel to the longitudinal axis of the nozzle bore, for deflecting a portion of the helically flowing annular sheet to form an individual sheet of fluid spray;

whereby a finely atomized, conical liquid spray dispersed throughout a small solid angle is obtained.

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**3,920,188**

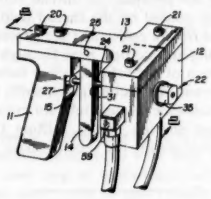
## PORTABLE URETHANE SPRAY GUN

**Sidney M. Price, Bel Air, Md., assignor to Erie Industrial Insulation Corporation, McKean, Pa.**

**Filed June 3, 1974, Ser. No. 475,602**

**Int. Cl.[2] B05B** *7/12*; **F23D** *13/38*

**U.S. Cl. 239—403** **3 Claims**




1. A spray gun and nozzle combination comprising,

a nozzle for projecting a spray made up of two components comprising,

an inner nozzle member made of a material having the resilient and frictional properties of Teflon, having an outer generally conical end and a central bore,

two laterally disposed bores in said inner nozzle member,

two tangential bores each communicating with a said lateral bore and extending inwardly therefrom and toward said conical end and terminating in said central bore whereby material from each of said lateral bores is projected into said central bore in a tangential path and mixes therein,

an outer nozzle member is disposed over said inner nozzle member,

said outer nozzle member having a concave conical end nesting on said inner nozzle member and having a central bore tapering from said conical surface to a small orifice,

a central rod extending through said central bore in said inner nozzle member,

said control rod having trigger means attached thereto,

said control rod making sliding and sealing engagement with the inner surface of said central bore, thereby providing a seal preventing the escape of material.

**3,920,189**

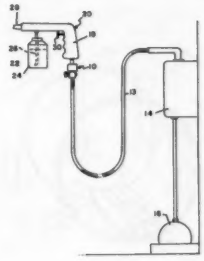
## COMPRESSED AIR DRYER-HANDLE ATTACHMENT FILTER

**William D. Maggiacomo, Beverly, and Fred A. Winslow, Marblehead, both of Mass., assignors to William D. Maggiacomo, Beverly, Mass.**

**Filed Oct. 9, 1973, Ser. No. 404,229**

**Int. Cl.[2] B05B** *7/02*

**U.S. Cl. 239—526** **8 Claims**




1. A replaceable moisture filter for a compressed air driven tool comprising, a tubular retainer which attaches to said tool proximate the compressed air inlet thereof such that the compressed air passes therethrough, said retainer having at least two members which fit together including a first member secured within a second member to define a filter chamber therein, a moisture collecting filter sized to fit within said chamber (within said retainer), an inlet channel passing through said retainer to an inlet end of said chamber, an outlet channel passing through said retainer to an exit end of said chamber, (a) an exit screen releaseably secured between shoulders defined by said first and second members at the exit end of said chamber, an inlet screen positioned at the inlet end of said chamber on a shoulder on said first member, means to separate said first and second members to open said chamber to insert and replace a moisture filter therein and means to rejoin said members to close said chamber said moisture collecting filter being positioned between said screens.

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**3,920,190**

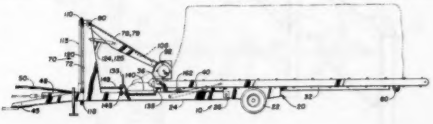
## STACK PROCESSOR

**Glenn G. Kanengieter, Blooming Prairie, and Gerald E. Barry, Owatonna, both of Minn., assignors to Owatonna Manufacturing Co., Owatonna, Minn.**

**Filed Oct. 21, 1974, Ser. No. 516,748**

**Int. Cl.[2] A01F** *29/00*

**U.S. Cl. 241—30** **10 Claims**

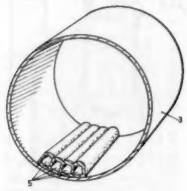


9. The method of feeding a stack of harvested crop which includes the steps of loading a stack on to a support; advancing the stack on the bed support in a step-by-step motion until the edge of the stack is adjacent one end of the bed support; pivoting a shredder through the stack from the top thereof and through an arc toward the bottom edge of the stack and adjacent the bed, causing the material in the stack to fall beyond the edge of the stack and the bed support; collecting the shredded material and conveying the same away from the stack in a direction transversed to the direction of advancement of the stack; and repeating the stack advancing, shredding and material collecting and removing steps successively until the stack is totally unloaded from the support.

## 3,920,191
## LINERS FOR COMMINUTION APPARATUS

Arthur Albert Bradley, Parkview, Johannesburg, South Africa, assignor to Trelleborgs Gummifabrik Aktiebolag, Trelleborg, Sweden

Filed Feb. 12, 1974, Ser. No. 441,788
Claims priority, application South Africa, Feb. 15, 1973, 73/1076
Int. Cl.² B02C 17/22
U.S. Cl. 241—182 2 Claims



1. In a comminution mill having means providing a cavity for containing a charge and means for agitating the charge in the cavity,

a resilient elastomer wear piece lining the cavity and exposed directly to the charge within the cavity, said wear piece having treads formed in its exposed surfaces to prevent slippage between a charge and the liner, said wear piece being hollow and inflated to reduce its rate of wear produced by abrasion and impact of the charge thereagainst.

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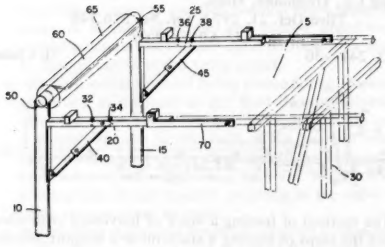
## 3,920,192
## ATTACHMENT FOR PAPERHANGER'S TABLE

Robert G. Viacava, 76 Baylor Lane, Pleasant Hill, Calif. 94523

Filed Aug. 1, 1974, Ser. No. 493,765
Int. Cl.² B65H 75/02
U.S. Cl. 242—55 6 Claims




1. An attachment for a paperhanger's table comprising, in combination,

a pair of legs,

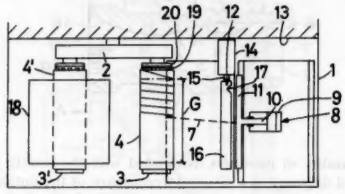
means for rigidly attaching said legs to such table in vertical relationship thereto, and

means for journalling a roll of paper between such legs, so that said legs carry said roll, yet allow it to be unfurled across said table by an artisan.

## 3,920,193
## WINDING APPARATUS WITH AUTOMATIC CHANGING OF TUBES OR THE LIKE

Peter Gujer, Effretikon; Hans Schellenberg, Winterthur, and Olivier Wüst, Seuzach, all of Switzerland, assignors to Rieter Machine Works Ltd., Winterthur, Switzerland

Filed Mar. 4, 1974, Ser. No. 447,853
Claims priority, application Switzerland, Dec. 14, 1973, 17526/73
Int. Cl.² B65H 67/04, 54/34
U.S. Cl. 242—18 A 7 Claims




1. A winding device for automatically changing tubes for taking-up endless threads or the like, said winding device being provided with a thread traversing device for generating thread winding wraps, a thread deflecting device for lifting the thread off the thread traversing device, a thread holding device provided with a thread guiding device for guiding the thread in its lifted-off position during the change of the bobbin tube, and at least two driven bobbin chucks alternately brought into a bobbin or tube change position respectively, each of said bobbin chucks supporting one tube, a thread catching and cutting zone arranged adjacent to one end of the associated tube and rotating with such tube, said thread holding device being arranged such that the thread lifted off the thread traversing device is guided thereby in the immediate vicinity of the thread catching and cutting zone, the improvement comprising the provision of thread shifting means for shifting the thread guided by the thread holding device in a first shifting phase from a position at the immediate vicinity of the thread catching and cutting zone through such zone and onto an end portion of the tube adjacent thereto, and which thread shifting means in a second phase shifts the thread over a predetermined distance on such tube for creating the reserve wraps, said thread shifting means shifting the thread at a higher shifting speed during the second phase than during the first phase.

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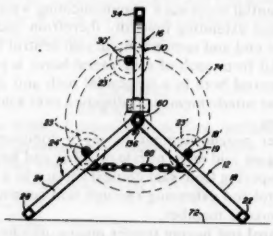
## 3,920,194
## FOLDABLE REEL SUPPORT AND CARRIER

Edward M. Parsen, Box 23, Miller, S. Dak. 57362

Filed Dec. 10, 1974, Ser. No. 531,215
Int. Cl.² B65H 17/46
U.S. Cl. 242—85 15 Claims



1. A reel support including a first outer large dimension frame, a second intermediate medium dimension frame and a third inner small dimension frame, said frames each including

a pair of spaced side-by-side legs interconnected at one pair of corresponding ends and being positionable with said legs of said third frame received between the legs of said second frame and the legs of said second frame received between the legs of said first frame, a pair of aligned sleeve journal means pivotally interconnecting each set of corresponding other ends of said legs together for relative oscillation of said frames from collapsed positions with said frames generally paralleling each other and open positions with said one of said frames disposed in inverted downwardly opening position and the other two frames opening upwardly and being upwardly convergent toward an upstanding plane containing said one frame, and axle means removably rotatably journaled through said sleeve journal means adapted to removably support a reel therefrom.

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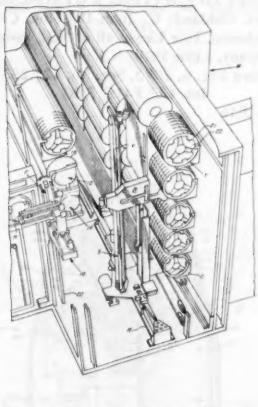
**3,920,195**
**AUTOMATIC TAPE REEL MOUNT**

**Richard E. Sills, and Gary L. Allison, both of Boulder, Colo., assignors to Xytex Corporation, Boulder, Colo.**

**Filed Jan. 9, 1974, Ser. No. 432,063**
**Int. Cl.² G03B** *1/04*; **G11B** *15/32*; **B65G** *47/00*, *65/02*
**U.S. Cl. 242—180** **22 Claims**



**20.** In an automatic reel mount assembly according to claim **18,** said cam means including a cam ring, cam tracks positioned on said cam ring at spaced circumferential intervals aligned with the inner ends of said radially extending arms, cam followers disposed at the inner ends of each of said arms and movable in said cam tracks to impart radial movement to said arms in response to rotation of said cam ring.

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**3,920,196**
**FILM CARTRIDGE**

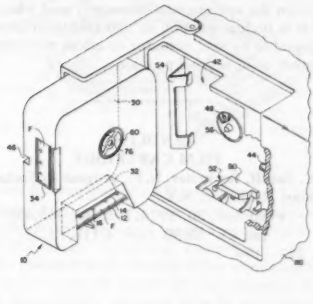
**Archie J. Tucker; Stephen H. Miller, and Robert C. Sutliff, all of Rochester, N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.**

**Filed Apr. 30, 1974, Ser. No. 465,452**
**Int. Cl.² G03B** *1/04*; **G11B** *15/32*
**U.S. Cl. 242—194** **3 Claims**

**1.** In a film cartridge having walls defining (1) a supply chamber for a roll of film or the like having a tendency to become stepped in an axial direction and (2) a take-up chamber for receiving film, one of the walls defining the supply chamber being flexible, the cartridge having a supply post located in the supply chamber with a surface of the post being adjacent the flexible wall, and a take-up core rotatable in the take-up chamber for winding up film into that chamber, the improvement comprising:

a pusher member positioned in the cartridge between the surface of the supply post and said flexible wall, said member being mounted for pivotal movement between a first position and a second position and being effective when moved from its first position to its second position to flex said one wall outwardly and thereby expand the chamber, and

a control member mounted in the cartridge for movement between a first position and a second position relative to said pusher member and being effective to pivot said



pusher member into its second position when moved from its first position to its second position, and said control member having means engageable with said take-up core when said control member is in its first position for securing said core against rotation, said securing means being disengaged from said take-up core when said control member is in its second position to permit rotation of said take-up core.

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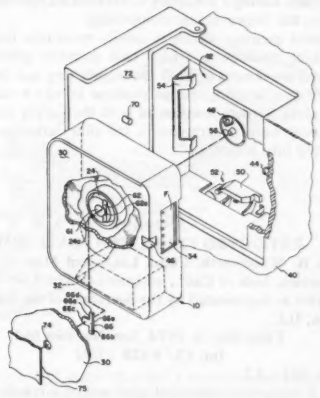
**3,920,197**
**FILM CARTRIDGE**

**Archie J. Tucker, Rochester, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.**

**Filed Apr. 30, 1974, Ser. No. 465,453**
**Int. Cl.² G03B** *1/04*; **G11B** *15/32*
**U.S. Cl. 242—194** **3 Claims**



**1.** In a film cartridge having walls defining a supply chamber for a roll of film or the like having a tendency to become stepped in an axial direction, one of the walls defining the chamber being flexible, and the cartridge having a supply post located in the chamber and with a surface of the post being adjacent the flexible wall, the improvement comprising:

means defining an opening in the flexible wall of the cartridge for receiving an actuator; and

a member positioned in the cartridge between the surface of the supply post and said flexible wall, said member being mounted for pivotal movement in response to the entry of the actuator into said opening between a first position and a second position and being effective when moved from its first position to its second position to flex said one wall outwardly and thereby expand the chamber, said member having a lever arm portion which is located between the opening and the supply post when the member is in its first position so that said lever arm portion is engageable by said actuator to effect movement of said member to its second position.

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**3,920,198**

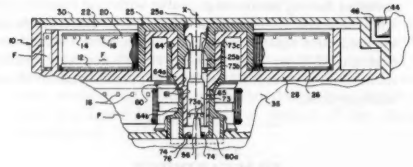
**FILM CARTRIDGE**

**Robert C. Sutliff, Rochester, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.**

**Filed Apr. 30, 1974, Ser. No. 465,456**

**Int. Cl.[2] G03B** *1/04; G11B 15/32*

**U.S. Cl. 242—194** **9 Claims**



**1.** In a film cartridge including a supply ring in a supply chamber and a take-up core in a take-up chamber for use with a roll of film having a tendency to become stepped in the axial direction, the improvement comprising:

a control member which is axially moveable from a first, locking position in which said member prevents rotational movement of both the supply ring and the take-up core to a second, release position in which said control member permits rotation of both the supply ring and the take-up core, responsive to the film cartridge being inserted into a camera.

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**3,920,199**

**RATE-GYRO STABILIZED PLATFORM**

**William H. Woodworth, China Lake, and Marc L. Moulton, Ridgecrest, both of Calif., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.**

**Filed May 3, 1974, Ser. No. 466,564**

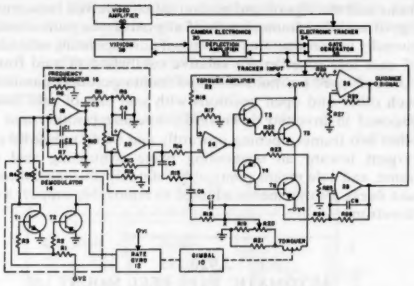
**Int. Cl.[2] F42B** *15/02*

**U.S. Cl. 244—3.2** **4 Claims**

**1.** In a rate-gyro controlled platform of a missile guidance system, a platform stabilizing network, comprising:

an electronically driven, gimbal mounted, rate-gyro stabilized platform on a supporting structure wherein the rate-gyro is electronically processed to provide an electrical output deviant from a value indicative of the spatial angular rate of change of the platform by a value indicative of the coulomb friction inherent in the gimbal bearings;

circuit means coupled to said output for providing an electrical signal definitive of said value indicative of the coulomb friction, which signal can be used to compensate for said deviation.



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**3,920,200**

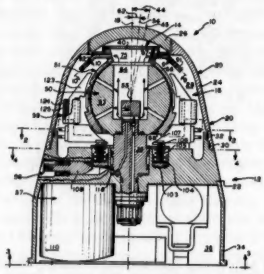
**PROJECTILE HAVING A GYROSCOPE**

**John L. Evans, Oakland; C. John DeCotiis, Cranford, and Victor P. Johnson, Fair Lawn, all of N.J., assignors to The Singer Company, Little Falls, N.J.**

**Filed Dec. 6, 1973, Ser. No. 422,253**

**Int. Cl.[2] F41G** *7/00*

**U.S. Cl. 244—3.16** **10 Claims**



**1.** A projectile including,

a housing,

an optical tracker, and

a gyroscope disposed within said housing,

said housing having a nose section and a base section forming a chamber enclosing said tracker and said gyroscope, said nose section having a window,

said optical tracker having an optical lens unit and an image detector unit mounted on said gyroscope, said optical unit being arranged to receive an image through said window and to transmit the image to said image detector unit,

said gyroscope comprising,

a stator mounted on said base section within said chamber, said stator having a stator axis of symmetry,

a hollow rotor mounted on said stator for rotation relative to said stator about a spin axis, said rotor spin axis innersecting said stator axis of symmetry at a pivot point,

said stator having an outer surface of spherical shape having a center of sphericity disposed substantially coincident with said pivot point,

anti-friction means disposed between said stator outer surface and said rotor inner surface to permit relative angular movement between said rotor and said stator, said rotor having an outer surface of spherical shape which is

formed of a magnetic permeable material, said rotor outer surface having a center of sphericity disposed substantially coincident with said pivot point,

wide-angle variable reluctant pick-off means for sensing the angle and direction of tilt of said rotor spin axis relative to said stator axis of symmetry,

said pick-off means including at least one pick-off unit with a magnetic core having upper and lower surfaces respectfully facing said rotor outer surface and being separated therefrom by respective gaps of uniform thickness,

said rotor outer surface being formed to constitue a highly permeable variable reluctance return path for said pick-off unit core and enabling said pick-off unit to sense over a relatively large tilt angle of said spin axis of said rotor relative to said stator axis of symmetry,

drive means adapted to rotate said rotor relative to said stator about said rotor axis, and wherein

said stator has a peripheral wall enclosing a recess, said recess being arranged to receive said image detector unit.

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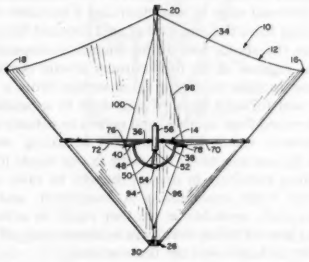
**3,920,201**

## PILOTLESS GLIDER CONSTRUCTION

**Willis R. Battles, 560 S. Helberta, Redondo Beach, Calif. 90277**

**Filed Sept. 9, 1974, Ser. No. 504,330**
**Int. Cl.² B64C** *31/02*
**U.S. Cl. 244—16** **8 Claims**



**1.** A pilotless glider comprising:

a wing structure;

a control bar attached to the underside of said wing structure;

a weight connected to a supporting wire, said supporting wire being attached to said wing structure and connected by connecting means to said control bar, said connecting means permitting transverse adjustment of said weight in respect to said control bar, said weight located a spaced distance beneath said wing structure, said weight movably mounted upon said supporting wire;

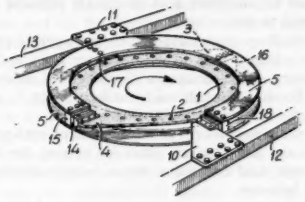
said control bar being trianqularly shaped with the base of the trianqularly shaped control bar being positioned substantially crossways to the line of flight of the glider; and said base of said triangularly shaped control bar including a bowed section, said connecting means being movable along said bowed section, whereby said weight is movable both transversely and longitudinally with respect to said wing as said connecting means is moved upon said bowed section.

**3,920,202**

## SUSPENSION SYSTEM FOR ROTOCRAFT ROTORS

**René Louis Mouille, Aix-en-Provence, France, assignor to Societe Nationale Industrielle Aerospatiale, Paris, France**

**Filed Apr. 25, 1974, Ser. No. 464,032**
**Claims priority, application France, May 8, 1973, 73.16475**
**Int. Cl.² B63C** *27/00*
**U.S. Cl. 244—17.27** **9 Claims**



**1.** A system for suspending on the fuselage of a rotorcraft the transmission housing of the rotor, said transmission housing being subject to movement about a central axis and in directions radial to the central axis, comprising

a baseplate fastened to the bottom of the transmission housing to move conjointly therewith, said baseplate having a pair of diametrically opposed radially extending shoulders,

means independent of said baseplate fixed relatively to the fuselage having radial projections extending in opposition to said shoulders to form an abutment therefor to limit the movement of said baseplate, and

resilient means interposed between each of said shoulders and said projections to absorb the force of said movement.

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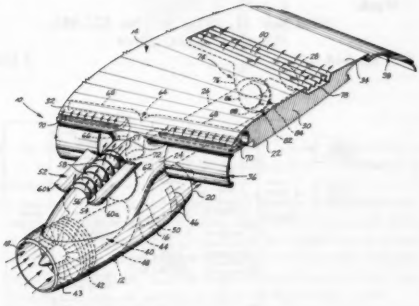
**3,920,203**

## THRUST CONTROL APPARATUS FOR OBTAINING MAXIMUM THRUST REVERSAL IN MINIMUM TIME UPON LANDING OF AN AIRCRAFT

**James R. Moorehead, Bellevue, Wash., assignor to The Boeing Company, Seattle, Wash.**

**Filed Dec. 23, 1974, Ser. No. 535,996**
**Int. Cl.² B64C** *21/04, 15/06*
**U.S. Cl. 244—42 CC** **13 Claims**



**1.** Thrust control apparatus for a turbofan jet propulsion engine in combination with an aircraft wing and means mounting said engine on said wing, said turbofan jet propulsion engine including a turbine engine having an outer wall terminating in a turbine engine nozzle means for directing a primary exhaust effluent rearwardly from said turbine engine relative to said wing, a cowling surrounding and spaced outwardly from a portion of the wall of said turbine, said cowling and the wall of said turbine defining therebetween a rearwardly ex-

tending annular fan duct, and a fan driven by said turbine engine, said fan being operatively positioned in said duct to generate a secondary exhaust effluent and direct said secondary effluent rearwardly through said fan duct, said wing including an upper airfoil surface said apparatus comprising:

a. a primary duct including means operatively coupling said primary duct to said fan duct for collecting said secondary effluent from said fan duct and including fan nozzle means for directing said secondary effluent rearwardly relative to said wing,

b. an auxiliary duct including means operatively coupling said auxiliary duct to said primary duct and including auxiliary nozzle means for directing said secondary effluent flowing through said auxiliary duct in an upward direction relative to said wing,

c. first valve means operatively associated with said primary duct and said auxiliary duct for varying the flow therethrough, said first valve means being selectively adjustable between

1. a cruise position wherein said first valve means is oriented to close said auxiliary duct and to permit flow of said secondary effluent through said primary duct,

2. at least one intermediate approach position wherein said first valve means is oriented in relation to said primary duct and said auxiliary duct to bifurcate the flow of said secondary effluent between said primary duct and said auxiliary duct, and

3. a reversing position wherein said first valve means is oriented to close said primary duct and to permit flow of said secondary effluent through said auxiliary duct, and

d. vane means operatively associated with said auxiliary nozzle means, said vane means being selectively movable between

1. an approach position wherein said vane means is oriented to divert said secondary effluent rearwardly relative to said wing, and

2. a reversing position wherein said vane means is oriented to divert said secondary effluent forwardly relative to said wing.

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**3,920,204**

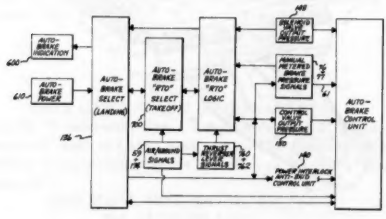
**REJECTED TAKE-OFF (RTO) CONTROL FOR AUTOMATIC BRAKING SYSTEM**

**Sherman M. Bissell, Bellevue, and Johan N. Hopland, Renton, both of Wash., assignors to The Boeing Company, Seattle, Wash.**

**Filed Nov. 11, 1974, Ser. No. 522,951**

**Int. Cl.[2] B64C** *25/44*

**U.S. Cl. 244—111** **5 Claims**




**2.** In an aircraft having a plurality of thrust reverser levers disposed for movement to an interlock position for providing reverse idle, the improvement comprising in combination:

an automatic braking system for providing one of a plurality of values of braking effort;

a rejected take-off control system;

said rejected take-off control system including a manually controlled take-off arming switch for arming said rejected take-off control system prior to take-off of said aircraft; and

said rejected take-off control system being actuated to provide the maximum of said plurality of values of braking effort in response to movement of two or more of said thrust reverser levers to said interlock position when the velocity of said aircraft is above a predetermined value.

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**3,920,205**

**AIRCRAFT**

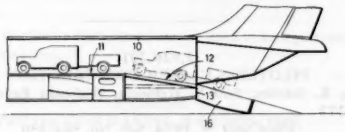
**Alan Brentford Bell, Bury, England, assignor to Hawker Siddeley Aviation Limited, England**

**Filed Apr. 5, 1974, Ser. No. 458,309**

**Claims priority, application United Kingdom, Apr. 5, 1973, 16417/73**

**Int. Cl.[2] B64C** *1/20*

**U.S. Cl. 244—118 R** **6 Claims**




**1.** A transport aircraft comprising a fuselage, a rear-loading cargo door forming an under portion of said fuselage near the after end thereof, said door having a hinge connection at its forward edge to a fixed door threshold portion of the fuselage so as to drop down about said hinge connection to form a loading ramp, a cargo floor inside said fuselage forward of said door, said floor having a fixed higher forward section at a level above the forward edge of said door and a movable rear section extending from the rear end of said forward floor section to said door threshold, four lifting members respectively located in the regions of the four corners of said movable rear floor section to raise said rear floor section from a position level with said forward edge of said door to a position level with said forward floor section, and means to actuate said four lifting members which lifting-member-actuating means include: first means selectively operable in one mode to actuate all four lifting members in unison thereby to raise said rear floor section while maintaining it horizontal; and second means selectively operable in another mode to actuate only the forward pair of lifting members independently of the rear pair so as to include said rear floor section.

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**3,920,206**

**NON-PENETRATING RIB-TO-SURFACE STRUCTURAL CLIP CONNECTOR ASSEMBLY**

**Carroll R. Bigham, Dunwoody, and Ronald E. Barrie, Smyrna, both of Ga., assignors to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.**

**Filed Aug. 5, 1974, Ser. No. 494,934**

**Int. Cl.[2] B64C** *3/26*

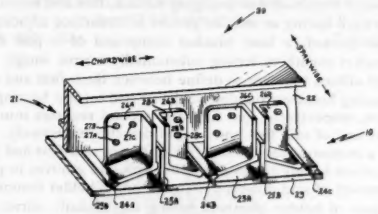
**U.S. Cl. 244—132** **1 Claim**

**1.** A connector assembly, adapted as a non-penetrating rib-to-skin structural clip connecting means for use in forming an airfoil which has chordwise and spanwise directions, at least one rib disposed chordwise, and a skin of suitable covering material having an inner surface and an outer surface, comprising:

a. a plurality of similar ridges disposed spanwise in equally spaced relationship on the inner surface of the skin of the airfoil;

b. a plurality of similar flanges, with one of each of said plurality of flanges interposed between every two adjacent ridges of said plurality of ridges, and with said flanges disposed spanwise in equally spaced relationship on the inner surface of the skin of the airfoil;

c. a plurality of similar clips that are trihedral angle-like configurated and are so dimensioned that each clip fits snugly between one ridge and an adjacent flange, and abuts with a chordwise disposed rib;



d. and, fasteners for attaching any of the said plurality of similar clips to a chordwise disposed rib.

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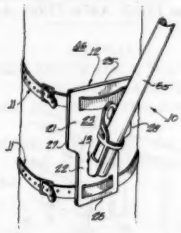
**3,920,207**
**FLAG POLE HOLDER**
**Richard C. Adamaitis, 4608 Drendell Road, Downers Grove, Ill. 60515**
**Filed Aug. 29, 1974, Ser. No. 501,709**
**Int. Cl.[2] A01K** *97/10*
**U.S. Cl. 248—42** **1 Claim**



1. A flagpole holder intended to be removably mounted to tree trunks, telephone poles, and the like, comprising:

a rigid base plate comprising a flat plate formed of metal and having a top portion of a general rectangular configuration formed along one edge contiguous with a lower portion of a smaller sized generally rectangular configuration, the base plate having a flat front surface, a flat back surface, a top edge, a bottom edge, and opposed side edges, the base plate further comprising a pair of identical transversely spaced apart vertically extending openings disposed in the top portion adjacent the top edge and a pair of substantially identical transversely spaced apart vertically extending openings disposed in the bottom portion adjacent the bottom edge thereof;

a pair of flexible strap retaining members operatively associated with the base plate and adapted to secure the base plate to a side of the supporting tree trunk, the straps being defined by a pair of separate identical flat rectangularly elongated flexible bands each having a buckle affixed to one end thereof and each provided with a plurality of latitudinally aligned spaced apart apertures in the opposite end thereof, each strap intended to be passed through a pair of associated openings in the base plate and to circle the supporting tree trunk with a selected one of the apertures brought into registration with the buckle to be secured thereby to removably retain the base plate mounted to the tree trunk with the back surface of the base plate in engagement with the tree trunk; and

a sleeve forming socket member affixed to the base plate and projecting upwardly and outwardly therefrom and adapted to removably receive therein the terminal end of a flagpole or mast to removably support the same therein for display purposes, the sleeve forming socket member being defined by a hollow open-ended sleeve body member having side walls, a back portion, a bottom end and a top end, a slot extending completely through the side walls between the top and the bottom end thereof, the bottom end of the sleeve body member diametrically opposed from the slot being flattened to provide a mounting surface disposed in juxtaposition with the base plate front surface on the bottom portion thereof and being welded thereto such that the sleeve body member projects upwardly and outwardly from the base plate at an angle thereto such that the top end of the sleeve forming socket member overlies a top central portion of the top portion of the base plate, a pair of identical diametrically opposed rectangularly shaped openings disposed through each of the side walls intermediate the slot and the back portion of the sleeve body member and extending between the top and bottom ends of the sleeve body member, and a cylindrical shaped ring member disposed normal to the axis of the sleeve body member and extending from the back portion completely through the rectangularly shaped openings and across the slot to define a supporting bracket for removably engaging a portion of the flagpole mast inserted thereinto.

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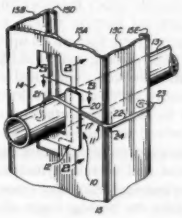
**3,920,208**
**PIPE CLAMP EMPLOYING ELECTROLYTIC CORROSION AND NOISE PREVENTIVE MEANS**
**Leroy D. Dowdy, 4122 N. 48th Drive, and Basil D. Ray, 4731 W. Fairmount, both of Phoeniz, Ariz. 85031**
**Filed Feb. 4, 1974, Ser. No. 439,022**
**Int. Cl.[2] F16L** *5/00*
**U.S. Cl. 248—56** **3 Claims**



1. An improved pipe clamping assembly for supporting a pipe in an opening in a metallic building stud comprising in combination:

an L-shaped pipe guard formed of a flat insulating material, said guard being slotted along the outside one half of its L-shaped peripheral configuration for receiving in a part of its slot the edges of the opening in the metallic support member, whereby a pipe may be positioned to rest between the legs of said L-shaped configuration, and

a right angular clamp comprising a pair of segments, one segment having its free end curved in the same plane as said one segment for fitting around a pipe, the free end of the other segment being curved at a right angle thereto within the same plane as said other segment and extending in the same direction as said one segment for fitting around the metallic building stud,

said clamp being positioned for holding a pipe between the legs of the L-shaped pipe guard fitted over the edge of an aperture in the metallic building stud and around at least a part of the building stud in a tight fitting arrangement.

## 3,920,209
## DRAWING TABLE

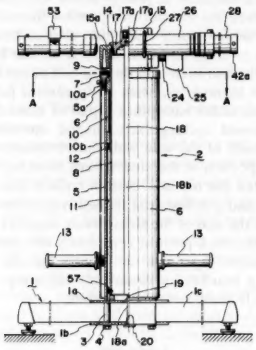
**Seiichi Komura, Osaka, Japan, assignor to Mutoh Industry Ltd., Tokyo, Japan**

**Filed Nov. 20, 1973, Ser. No. 417,530**

**Claims priority, application Japan, Nov. 28, 1972, 47-136090[U]; Nov. 28, 1972, 47-136083[U]; Nov. 28, 1972, 47-136082[U]**

**Int. Cl.² F16M** *11/28;* **A47F** *85/00*

**U.S. Cl. 248—162** **4 Claims**



1. A drawing table comprising a self-containing rod-like telescopic resilient means, a horizontal support base formed therein with a recess means for slidably removably receiving a lower end of said rod-like telescopic resilient means, a cylindrical support member disposed upright and fixed at a lower end thereof to said horizontal support base, a cylindrical elevatory member slidably supported in said cylindrical support member, and a cap removably mounted on an upper end of said cylindrical elevatory member and formed at its underside with a receiving portion means for slidably removably receiving and supporting therein an upper end of said rod-like telescopic resilient means, said rod-like telescopic resilient means being fitted in said cylindrical elevatory member and slidably removably received at its lower end in said recess means formed in said horizontal support base and slidably detachably received and supported at its upper end in said receiving portion means of said cap, said cap being mounted at the uppermost end of said cylindrical elevatory member, whereby the cylindrical elevatory member can be urged to move upwardly by the biasing force of the rodlike telescopic resilient means.

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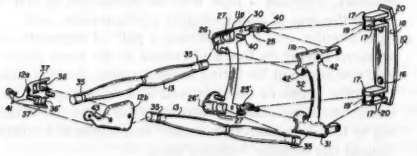
## 3,920,210
## PIVOTABLE WALL BRACKET

**Ruediger Einhorn, Katonah, N.Y., assignor to Coats & Clark, Inc., New York, N.Y.**

**Filed Feb. 21, 1975, Ser. No. 551,602**

**Int. Cl.² A47F** *5/00;* **F16B** *45/00*

**U.S. Cl. 248—290** **10 Claims**



1. A pivotable wall bracket comprising a unitary base member having a wall-engaging surface, first and second pairs of projections extending from a surface of said base member opposite said wall-engaging surface, and first and second bearing members extending between the projections of said first and second pairs of projections, respectively, said bearing members having substantially circular cross sections and being substantially axially aligned, the axis thereof parallel to and spaced from said wall-engaging surface, first and second dowels each having an annular groove in its surface adjacent each end thereof, a base bracket comprised of a pair of base bracket members having substantially mirror image shapes and affixed together to define between them first and second bearing holes surrounding said first and second bearing members, respectively, and first and second recesses into which one end of said first and second dowels, respectively, extend in a common plane defined by said axis, said first and second recesses having ridges extending into said grooves to prevent removal of said dowels therefrom, and a holder comprised of a pair of holder members having substantially mirror image shapes and affixed together and defining between them third and fourth recesses into which the other ends of said first and second dowels, respectively, extend, and an end portion adapted to suspend an object, each of said third and fourth recesses having portions extending into the grooves at the respective ends of said dowels extending thereinto, to firmly hold said dowels in said bracket and holder member.

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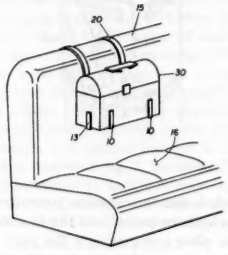
## 3,920,211
## LUNCH BOX HOLDER

**Martin Knight, Leesville, Ohio, assignor to The Raymond Lee Organization, Inc., New York, N.Y., a part interest**

**Filed Mar. 7, 1974, Ser. No. 448,804**

**Int. Cl. F16m** *13/02;* **A47b** *73/00;* **A47c** *7/70*

**U.S. Cl. 248—311** **3 Claims**



1. A bracket device adaptable for hanging from the top of a backrest of an automobile seat which retains a box in place so as to prevent horizontal motion of the retained box, said bracket device consisting of two inverted U-shaped members, each of a size to hang over the top of an automobile seat back, with the said two members joined together at a spaced distance from each other by a bar fastened with one rivet to each member,

the lower sections of the device, when installed on an automobile seat back, shaped to project in a horizontal plane away from the seat back, said lower sections each fitted with an end stop and side stop disposed so as to fit respectively about a side and an end of a box resting on said lower sections,

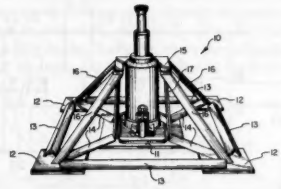
each said side stop being fomed of a bent flange at the end of a lower section of one of the inverted U-shaped members, and

each said end stop formed of a bent clip fastened by one rivet to the lower section of an inverted U-shaped member.

## 3,920,212
## JACK STAND

**Gordon L. Westwood, P.O. Box 3927, Central Point, Oreg. 97501**

**Filed Mar. 11, 1974, Ser. No. 449,732**
**Int. Cl.² F16M** *13/00*
**U.S. Cl. 248—346** **7 Claims**



1. A jack stand comprising
a base on which the base plate of a jack may be positioned; a horseshoe shaped collar spaced above the base;
support braces extending outwardly and downwardly from the collar to the base;
a lock strap positioned closely above the base and beneath the web of the horseshoe shaped collar whereby a portion of a base plate of a jack on the base may be positioned beneath the lock strap; and
means for supporting said lock strap.

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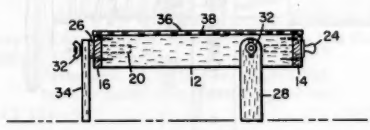
## 3,920,213
## PORTABLE REVERSIBLE WATER COLOR STRETCHER-EASEL

**William P. Hanson, Jr., 2030 N. Oak Lane, State College, Pa. 16801**

**Filed Feb. 8, 1974, Ser. No. 440,742**
**Int. Cl.² A47B** *97/04*
**U.S. Cl. 248—464** **3 Claims**

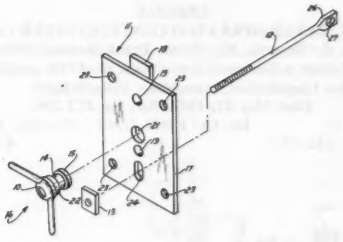


1. A portable reversible water color stretcher-easel adapted for the mounting of water color paper, comprising in combination:
a rectangular frame comprised of two side members and top and bottom members;
each said member of said frame having oppositely spaced inwardly sloping surfaces;
adjustable legs mounted upon said frame adapted to support said frame; said adjustable legs being comprised of, in combination:
a spacer member adjacent to said frame;
a rotatable support member adjacent to said spacer member;
a bolt extending through said frame, spacer member, and support member;
a nut screwably attached to said bolt;
whereby said adjustable legs may be rotated 360° about said bolt;
supports positioned upon said frame to maintain the rigidity thereof;
a front lateral side and a back lateral side of said frame, each side capable of mounting water color paper thereon; said frame being comprised of a material pierceable by staples.

## 3,920,214
## EXTERIOR FORM SPREADER SYSTEM FOR THREADED END CONCRETE TIES

**Peter R. Lovisa, 1040 Pelhamdale Ave., Pelham Manor, N.Y. 10803; Dusan Tausanovitch, 24 Crestwood Drive, Northport, N.Y. 11768, and Tullio E. Lovisa, 91 Whitson Road, Huntington, Long Island, N.Y. 11743**

**Filed Nov. 21, 1974, Ser. No. 525,887**
**Int. Cl.² E04G** *11/06, 17/06*
**U.S. Cl. 249—40** **9 Claims**



1. An exterior spreader system for threaded end ties having a longitudinal axis and for permitting adjustment of concrete forms in both lateral directions substantially normal to said axis, comprising nut means with notch associated therewith, a platewasher assembly for securement to the adjacent forms and for releasable coupling with the notch and nut means, the nut means with notch being located at one end and forming an integral part of a tie rod, the nut means adapted to bear on the exterior of the plate-washer assembly and the plate-washer assembly including shiftable means for entering into and retracting from the notch, the assembly including a plate and the shiftable means including a washer shiftably connected with the plate, the plate adapted to be nailed to the walers of the forms, the washer having a hole having a portion large enough to permit the notch to project therethrough and another portion of reduced dimension to engage with surfaces of the notch to releasably lock the assembly to the nut means.

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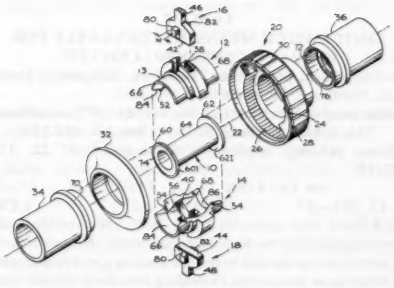
## 3,920,215
## VALVE

**Dieter W. Knauf, 16844 Edgar St., Pacific Palisades, Calif. 90272**

**Continuation-in-part of Ser. No. 331,002, Feb. 9, 1973, abandoned. This application May 13, 1974, Ser. No. 469,369**
**Int. Cl.² F16K** *7/06*
**U.S. Cl. 251—7** **9 Claims**



1. A valve comprising:
a tube of resilient material:
a pair of compressing members on opposite sides of the tube; and

means for moving the compressing members together and directly against said tube to squeeze the tube closed;

each compressing member having a length in a direction transverse to the axis of the tube, at least as great as the width of the fully squeezed-close tube, and each compressing member being concave near either end thereof, so that as the tube becomes fully squeezed the tube portions at the ends of the squeeze line are supported against outward movement, whereby to more completely close the tube.

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**3,920,216**

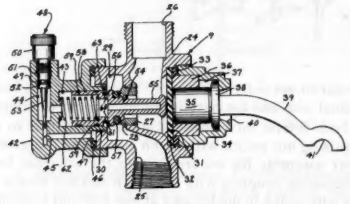
**LEVER OPERATED CONTROL VALVE**

**Thomas G. Barnum, Fox Point; Frank Hessler, Milwaukee, and Robert A. Larson, Germantown, all of Wis., assignors to Bradley Corporation, Menomonee Falls, Wis.**

**Filed May 22, 1974, Ser. No. 472,296**

**Int. Cl.² F16K *31/48***

**U.S. Cl. 251—51** **4 Claims**



1. In a flow control valve having:

a. a valve body with an inlet and an outlet;

b. a valve seat between the inlet and outlet;

c. a control cylinder opening upon said inlet which faces said valve seat;

d. a plunger having a valve head facing said valve seat and a hollow piston extending from the valve head into said control cylinder for reciprocation therein, said piston having a part thereof exposed to said inlet; and

e. an operating member for moving said plunger toward a valve open position;

the combination comprising:

f. a relief port in said plunger communicating radially between the interior of said hollow piston and said inlet; and

g. a flexible ring encircling the outside of said hollow piston which covers said relief port to form a check valve therefor, said flexible ring opening radially outward in response to pressure within said hollow piston.

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**3,920,217**

**LIMIT SWITCH MEANS, PARTICULARLY FOR HYDRAULIC STEERING CIRCUITS**

**Carl Ivar Olsen, Sonderborg, Denmark, assignor to Danfoss A/S, Nordborg, Denmark**

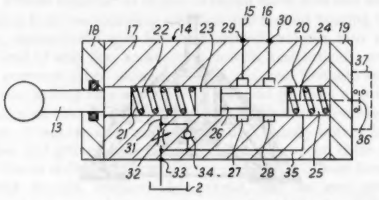
**Continuation of Ser. No. 416,178, Nov. 15, 1973, abandoned. This application Aug. 5, 1974, Ser. No. 494,719**

**Claims priority, application Germany, Nov. 22, 1972, 2257217**

**Int. Cl.² F16K *31/122*; F15B *15/22***

**U.S. Cl. 251—57** **1 Claim**

1. A limit stop assembly for a hydraulic steering system comprising a casing having a bore, a sensing element including first piston means in said bore and a sensing rod connected to said first piston means and extending exteriorly of said casing, second piston means in said bore spaced from said first piston means to form a first chamber therebetween, spring means on the side of said second piston means away from said first piston means, second spring means in said first chamber engaging each of said first and second piston means, means for supplying a fluid to said first chamber, two short circuiting ports in said casing having fluid communication with said bore, said ports being separated by said second piston means when said sensing rod is in an at rest position, and said second piston means being movable in response to movement of said sensing rod and first piston means through the medium of said fluid in said first chamber and said second spring means to



provide fluid communication between said short circuiting ports, said casing having an exhaust port which has fluid communication with the exterior of said casing and is fluidly separated from said short circuiting ports, and a throttling passage between said first chamber and said exhaust port to control said response of said second piston means to said movement of said first piston means.

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**3,920,218**

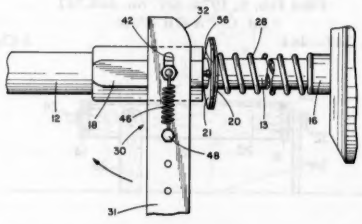
**SPREADER BAR**

**Edward D. Wilkerson, P.O. Box 755 S. Court, Normandy Beach, N.J. 08739**

**Filed Nov. 15, 1974, Ser. No. 524,238**

**Int. Cl.² B66F *3/00***

**U.S. Cl. 254—114** **16 Claims**



1. A spreader for spreading apart the steerable wheels of a vehicle to take up the lost motion therein for testing and correcting wheel alignment, the combination comprising; a first rod section having a distal end adapted to engage one wheel, a second rod section slideable in said first rod and having a distal end adapted to engage the other wheel, spring means urging said rod sections apart, means for incrementally extending said first rod section with respect to said second rod section, and means for holding said rod sections in an incremental position against the resistance of the wheels when said means for extending is not extending the first rod section relative to the second rod section.

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**3,920,219**

**APPARATUS FOR TIGHTENING BELTS**

**James N. Hendrix, Jr., Rte. A-3, Box 158-AE, Pearland, Tex. 77581**

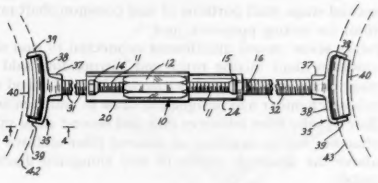
**Filed July 2, 1974, Ser. No. 485,124**

**Int. Cl.² B66F *3/08***

**U.S. Cl. 254—67** **2 Claims**

1. Apparatus for applying force between spaced sheaves, comprising first and second telescopingly engaged tubular members each having laterally extending means, relative slid-

ing movement of said first and second tubular members increasing or decreasing the combined length thereof, jack means connected between said laterally extending means of said first and second tubular members for controlling said relative sliding movement thereof, each of said tubular members having engagement means at its outer end for engaging one of said spaced sheaves, one of said laterally extending means comprising an interiorly threaded body having a threaded rod engaged therethrough, the other of said laterally extending means including an opening through which said threaded rod is rotatively disposed, said rod means having collar means therearound at opposite sides of said opening to prevent axial motion of said threaded rod means with respect



to said opening; each of said engagement means including a tapped opening at the outer end of the tubular member, a threaded rod removably screwed into the tapped opening of each said tubular member, and an engagement element screwed onto the outer end of each said threaded rod having an edge adapted to engage within the peripheral groove of a sheave, each said engagement element comprising a threaded socket, a curved bar disposed crossways behind

said socket, a length of V-belt disposed with its outer surface against said curved bar, the ends of said curved bar being outwardly bent to engage the opposite ends of said length of V-belt to clamp said length of V-belt in place against said curved bar.

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**3,920,220**

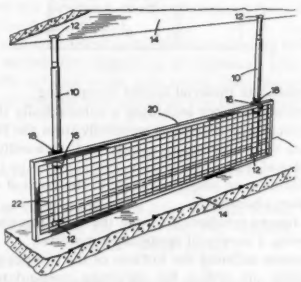
## JACK POST

**Murray A. Elias, Islington, Canada, assignor to Dell Holdings Limited, Toronto, Canada**

**Filed Jan. 17, 1975, Ser. No. 541,705**

**Int. Cl.[2] B66F** *3/08*; **E04H** *17/00, 17/04*

**U.S. Cl. 254—98** **4 Claims**



1. A jack post comprising

a. a tubular base section having a longitudinal axis,

b. a nut with a threaded through opening formed therein,

c. mounting means for mounting said nut in a position resting on one end of said base section with said threaded through opening thereof aligned with the longitudinal axis of said base section,

d. a threaded stem threadedly engaging said threaded opening of said nut,

e. a rigid shank resting on and projecting upwardly from said stem,

f. a tubular guide section supported by said nut and adapted to contain and guide said rigid shank in aligned driving engagement with said threaded stem whereby rotation of said nut with respect to said threaded stem causes longitudinal movement of said shank with respect to said tubular base.

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**3,920,221**

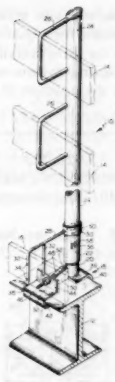
## CONSTRUCTION SAFETY ANCHOR MEANS

**Clifford M. Berry, 110 Hillcrest Ave., Manhasset, N.Y. 11030, and Orson R. Curtis, Box 149, Cobalt, Conn. 06414**

**Filed May 31, 1973, Ser. No. 365,622**

**Int. Cl.[2] E04H** *17/14*

**U.S. Cl. 256—59** **3 Claims**



1. In safety anchor means for use in conjunction with such as an I-beam or reinforcing steel for poured-in-place reinforced concrete or the like at spaced intervals along the I-beam or reinforced concrete for the support of safety rails and/or toe boards, the improvement comprising: expendable anchor support means permanently fixed to the I-beam or reinforcing steel, and safety rail and toe board support means releasably attached to the anchor support means for ready removal and reuse at another construction site the anchor support means including a clamp fixed to the I-beam and a coupling fixed to the clamp, and the safety rail and toe board support means including a shaft releasably engaged with the coupling and a post releasably engaged with the shaft.

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**3,920,222**

## METHOD AND APPARATUS FOR REGULATING ROTARY VIBRATORS

**James Edward Brander, Cronulla, Australia, assignor to International Combustion Australia Limited, Australia**

**Filed Feb. 22, 1973, Ser. No. 334,568**

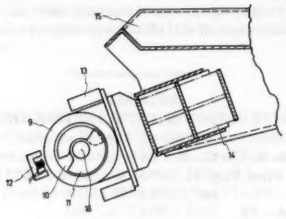
**Claims priority, application Australia, Feb. 25, 1972, 8086/72**

**Int. Cl.[2] B06B** *1/16*

**U.S. Cl. 259—1 R** **8 Claims**

2. A rotary vibrator comprising a drive shaft, vibrator motor means for driving said shaft, a first eccentric mass mounted fixedly at each end of said shaft, a second eccentric mass mounted at each end of said shaft adjacent said fixed mass for angular relative movement with respect to said first mass, intermediate spring means connecting said vibrator to a mass to be vibrated, the maximum angular relationship between said first and second masses during operation being such that

the frequency of the vibrations imparted by the vibrator is near to but below the resonance of said intermediate spring means; said vibrator further including means for controlling the angular relationship between said first and said second eccentric masses whereby the thrust imparted to the mass to



be vibrated via said intermediate spring means may be adjusted, counterweight means for adjusting the relative acceleration of said vibrator in the direction of the spring system and perpendicular to said spring system such that the variable force applied to change the position of said free mass is minimal.

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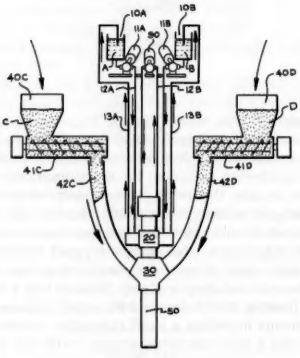
**3,920,223**

## PLURAL COMPONENT MIXING HEAD

**Wallace F. Krueger, 4401 Merriweather Ave., Toledo, Ohio 43623**

**Filed July 5, 1973, Ser. No. 376,878**
**Int. Cl.[2] B01F** *7/24*
**U.S. Cl. 259—8** **3 Claims**



**1.** In a plural component mixing system of the class described involving the mixing of plural liquid resins and solid filler additives, a first stage mixing chamber, means for introducing metered quantities of plural resin components into said first stage mixing chamber, means for mixing said plural resin components within said first stage mixing chamber, and means for discharging the mixed plural resin components from said first stage mixing chamber;

a second stage mixing chamber, having an elongated discharge nozzle for introducing mixed plural resin components from said first stage mixing chanber into said second stage mixing chamber, means for introducing metered solid filler additives into said second stage mixing chamber above the outlet of said elongated discharge nozzle, means for thoroughly mixing said filler additives with said plural resin components within said second stage mixing chamber, and means for discharging the resin-filler mix from said second stage mixing chamber,

a single common shaft mixing rotor common to both said first and second stage mixing chambers and said common shaft mixing rotor having,

a hard bearing material rotor ball portion thereon for bearing, centering and sealing against the periphery of a hard bearing material seating and sealing shaft opening,

a spring loaded means on said rotor shaft for lifting and holding said rotor shaft ball portion in bearing seating and sealing contact with said bearing seating and sealing shaft opening periphery and

a rotary shaft coupling means secured to said rotary shaft above said bearing seating and sealing shaft opening periphery for coupling to a rotary motor for imparting variable high speed rotary motion to said rotary shaft,

a mixing means attachment on each of the first stage and second stage shaft portions of said common shaft mixing rotor for mixing purposes, and

a rotary screw means attachment connected to said single common shaft mixing rotor and surrounding said first stage elongated discharge nozzle within said second stage mixing chamber and designed to draw in and control the flow of solid filler additives into said second stage mixing chamber and to maintain an assured filler additive level above the discharge outlet of said elongated discharge nozzle.

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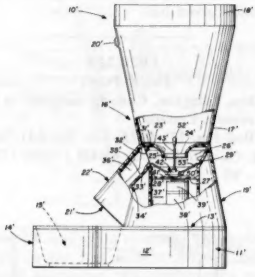
**3,920,224**

## PARTICULATE MATERIAL FEEDER

**Arthur L. Fassauer, Canyon, Tex., assignor to Fassauer Industries, Inc., Canyon, Tex.**

**Continuation-in-part of Ser. No. 275,756, July 27, 1972, Pat. No. 3,800,745. This application Sept. 14, 1973, Ser. No. 397,356The portion of the term of this patent subsequent to Apr. 2, 1991, has been disclaimed.**
**Int. Cl.[2] A01K** *5/02*; **B01F** *15/02*
**U.S. Cl. 259—8** **9 Claims**



**5.** A particulate material feeder comprising:

an agitation chamber including a substantially flat floor, a cylindrical wall extending upwardly from the floor, and a conical wall tapering upwardly and outwardly from the cylindrical wall;

means forming an outlet aperture in the conical wall of the agitation chamber;

hopper means positioned above the agitation chamber for receiving a supply of particulate material;

guide means defining the bottom of the hopper means and including an orifice for directing particulate material from the hopper means into the agitation chamber under the action of gravity;

an agitator assembly mounted in the agitation chamber and comprising a molded hub and a pair of agitator rods extending upwardly and outwardly from the hub said hub and rods being positioned below the horizontal plane of the lower edge of said outlet aperture and

means for rotating the agitator assembly in the bottom of the agitation chamber and thereby establishing a zone of

fluidized particulate material traveling around the conical wall of the agitation chamber and flowing out of the agitation chamber through the discharge opening whenever it is aligned therewith.

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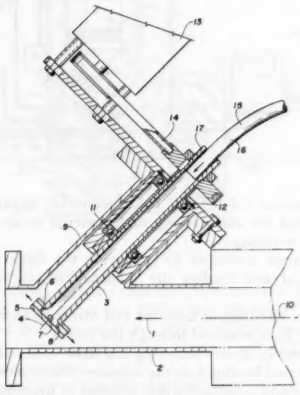
**3,920,225**

## CENTRIFUGAL CHEMICAL MIXER

**Merle D. Lee, and Lloyd R. Lee, both of Hackettstown, N.J., assignors to The Raymond Lee Organization, Inc., New York, N.Y., a part interest**

**Filed Oct. 1, 1974, Ser. No. 511,043**
**Int. Cl.[2] B01F** *7/02, 15/02*
**U.S. Cl. 259—22** **2 Claims**



1. The combination of a pipe fitting and a centrifugal chemical mixer for evenly distributing a chemical in sludge passing through the pipe fitting, said combination comprising

a pipe fitting having an arm extending substantially 45° relative to the axis of the pipe fitting;

a centrifugal chemical mixer comprising a tube rotatably mounted substantially coaxially in the arm of the pipe fitting for rotation about its axis and extending into the pipe fitting at an angle relative to the axis of the pipe fitting, said tube having a closed end in the pipe fitting and a plurality of substantially radially extending holes therein for flinging a chemical outward from the tube at the closed end thereof;

motive means coupled to the tube for rotating the tube; and

feed means for supplying a chemical into the tube whereby rotation of the tube evenly distributes the chemical centrifugally into sludge in the pipe fitting.

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**3,920,226**

## COMBINATION FROZEN JUICE REMOVER, MIXER AND CONTAINER

**Robert Alan Walt, 1445 Fern Ave., Duluth, Minn. 55805**

**Filed June 13, 1974, Ser. No. 478,894**
**Int. Cl.[2] B01F** *11/00*
**U.S. Cl. 259—72** **2 Claims**

1. A device for removing frozen juice from a container and mixing the same with a liquid in the container comprising in combination:

a. a walled receptacle having

b. a bottom,

c. a rigid blade having a rectangular outline and secured at one end edge to said bottom extending upwardly therefrom within the receptacle and spaced from the top and wall thereof for insertion into the frozen juice of a container to impale the frozen juice on the blade, and

d. said blade having a helical twist with the free end edge of the blade normal to the longitudinal axis of the blade for

engagement with the frozen juice for removal of the juice by withdrawal of the container from the frozen juice impaled upon the blade.

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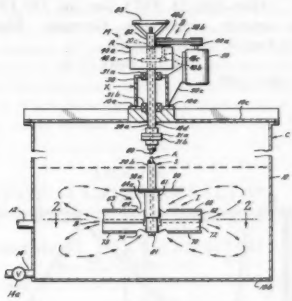
**3,920,227**

## ADJUSTABLE MIXING DEVICE

**Philip E. Davis, Jr., P.O. Box 35729, Houston, Tex. 77035**

**Filed June 13, 1974, Ser. No. 479,116**
**Int. Cl.[2] B01F** *5/16*
**U.S. Cl. 259—96** **11 Claims**



1. A mixing apparatus for agitating fluids in a container comprising:

a. drive shaft means adapted to extend into a container,

b. support means for supporting said drive shaft means for axial rotation;

c. driving means mounted with one end of said drive shaft means for imparting a driving force thereto for axial rotation;

d. impeller means mounted with an opposite end of said drive shaft means for immersion in a fluid in a container having a surface coacting with the fluid for positively displacing a portion of said fluid outward substantially laterally from the axial alignment of said drive shaft means and into counter-rotating and circulating turbulences within said container; and

e. area-adjusting means for adjusting the surface area of said impeller means coacting with the fluid for varying the volume of fluid positively displaced during axial rotation for controlling the torque required from said driving means;

f. said impeller means comprising

1. a first impeller member having at least one blade member mounted therewith;

2. a second impeller member having at least one blade member mounted therewith;

3. said second impeller member being disposed in longitudinal spaced relationship with said first impeller member to provide an adjustable space therebetween and to provide a longitudinal overlapping arrangement of said blade members for engagement of said blade members to form an adjustable surface for said coacting with a portion of the fluid;
4. one of said impeller members mounted with said drive shaft for fixed axial rotation;
5. one of said impeller members rotatably mounted with said area-adjusting means for axial rotation and adapted for longitudinal movement relative to said other impeller member whereby the fixedly mounted impeller member drives the rotatably mounted impeller member during axial rotation; and
6. at least one of said impeller members having an axial opening to provide for fluid flow in the container into the space between said impeller members for positive displacement thereof substantially laterally through said space by said longitudinally overlapping blade members during axial rotation.

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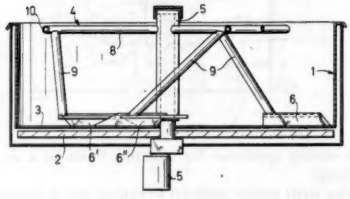
## 3,920,228
## SCRAPING AND STIRRING DEVICE FOR A COOKING UTENSIL

**Bernhard Klauk, Gelsenkirchen; Wolfgang Schwan, Gelsenkirchen-Buer, and Günter Schreiber, Lunen, all of Germany, assignors to K. Kuppersbusch & Sohne, Gelsenkirchen, Germany**

**Filed Feb. 23, 1973, Ser. No. 335,179**
**Claims priority, application Germany, Mar. 1, 1972, 2209731; Aug. 4, 1972, 2238350**
**Int. Cl. B01f** *7/20*
**U.S. Cl. 259—107** **5 Claims**

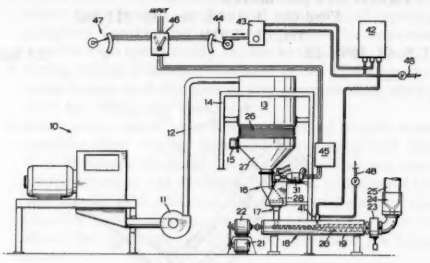



1. A scraping and stirring device for a cooking utensil comprising a driving member adapted to be arranged centrally in the bottom of said cooking utensil and extending into an upper region of said cooking utensil, horizontally extending supporting arms carried by said driving member at an upper part thereof and extending outwardly therefrom a distance which is at least half the radial extent of the device, carrying arms carried by and depending from said supporting arms and connected to said supporting arms towards outer ends of said supporting arms, scraping and stirring vanes carried by said carrying arms and having one edge in engagement with the bottom of said utensil and adapted in use to work only a part of the bottom of said cooking utensil, and retaining strips having an overall L-shape with horizontal limbs adapted to run parallel with the bottom of said cooking utensil for retaining said scraping and stirring vanes on said carrying arms.

## 3,920,229
## APPARATUS FOR FEEDING POLYMERIC MATERIAL IN FLAKE FORM TO AN EXTRUDER

**David C. Piggott, Burlington, Canada, assignor to PCL Industries Limited, Willowdale, Canada**

**Continuation-in-part of Ser. No. 402,245, Oct. 1, 1973, abandoned. This application Oct. 15, 1974, Ser. No. 514,344**
**Claims priority, application Canada, Oct. 10, 1972, 153525**
**Int. Cl.² B29F** *3/02*
**U.S. Cl. 259—192** **11 Claims**




1. Apparatus for feeding flake polymeric material to an extruder and for compressing such material to an increased density, comprising:
a. a storage container for receiving the flake polymeric material and feeding the material therein to an exit throat,
b. means vibrating at least the exit throat to facilitate feed of the flake material through the throat,
c. a crammer device receiving the flake material from the throat and feeding it to the extruder, the crammer device comprising a conical screw member of decreasing radius in the direction of passage of material therethrough, and a casing enclosing the screw member,
d. a crammer motor driving the screw member, and
e. means controlling the speed of the said crammer motor to control the rate of feed of the crammed material to the extruder.

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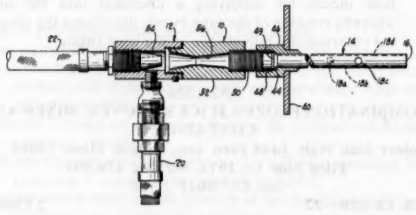
## 3,920,230
## BLAST FURNACE FUEL INJECTOR LANCE

**James C. Murphy, Seven Hills, Ohio, assignor to Republic Steel Corporation, Cleveland, Ohio**

**Filed Aug. 29, 1974, Ser. No. 501,607**
**Int. Cl.² C21B** *7/16*
**U.S. Cl. 266—29** **8 Claims**




1. A lance tip for introducing fuel to a blast furnace, comprising:
a tube with open unobstructed ends through which an atomized fuel can flow for introduction into a blow pipe to a tuyere of a blast furnace,
said tube having one end portion adapted to extend into the blow pipe at an angle to the blow pipe axis, and
orifice means through said portion of the tube forming two longitudinally and circumferentially displaced passage

portions, through which a flow of gas from outside said tube moving at an angle to the tube can pass to disperse fuel and to produce a pilot flame, the locus of said orifice means being along a helical path with a total circumferential displacement of at least 360°.

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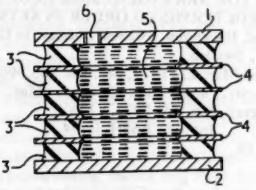
**3,920,231**
**RUBBER SPRINGS**

**Reginald Harrison, Oadby; Michael John Smedley, Coalville, and Bernard Ridge Wing, Thurnby, all of England, assignors to Dunlop Limited, London, England**

**Filed Apr. 16, 1973, Ser. No. 351,344**
**Claims priority, application United Kingdom, Apr. 17, 1972, 17554/72**
**Int. Cl.² B60G** *11/62*
**U.S. Cl. 267—35** **7 Claims**



1. A spring comprising:
means defining a closed chamber, said means comprising a pair of rigid metal end plates, several rubber members bonded between said end plates to form a stack, and annular interleaving plates bonded between adjacent rubber members,
damping means within the chamber, and
a liquid filling said chamber whereby in displacement of the spring the pressure of the liquid acts on the annular rubber member to modify the resistance to displacement of the spring.

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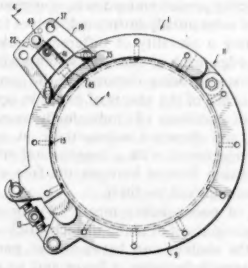
**3,920,232**
**APPARATUS FOR ALIGNING PIPE ENDS**

**Julius Clark, P.O. Box 555, Broken Arrow, Okla. 74012**

**Filed July 16, 1974, Ser. No. 489,064**
**Int. Cl.² B23P** *19/00*
**U.S. Cl. 269—25** **10 Claims**



1. Apparatus for aligning contiguous ends of a plurality of end-to-end pipe sections, comprising in combination ring means for surrounding the pipe sections adjacent their ends, the ring means having a plurality of holes therein peripherally spaced apart about said ring means, a frame, means for releaseably securing said frame in any peripherally adjacent pair of said holes, and an elongated longitudinally extensible ram mounted at its outer end on said frame and having a shoe at its inner end that presses radially inwardly against a said pipe end at a selected point about the periphery of said pipe end upon extension of said ram.

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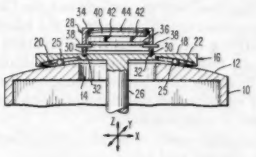
**3,920,233**
**SPHERICAL SUPPORT AND TRANSLATION DEVICE FOR WAFERS**

**Paul E. Stuckert, Katonah, N.Y., assignor to International Business Machines Corporation, Armonk, N.Y.**

**Filed June 11, 1974, Ser. No. 478,427**
**Int. Cl.² H01L** *21/68*
**U.S. Cl. 269—55** **8 Claims**



1. A support and translation device for wafers during an exposure process comprising a base having a curved surface, a table having an oppositely curved undersurface complementary to the curved surface of said base, bearing means disposed intermediate said base and said table to support said table for movement relative to said base and carriage means mounted on said table, said carriage means including a backing plate having a continuous, non-perforated curved upper surface having the same center of curvature as the surface of said base for completely supporting a wafer and wafer clamping means mounted on said device and overlying said curved surface of said backing plate for holding a wafer against the curved surface of said backing plate to impart a curved configuration to the upper surface of said wafer.

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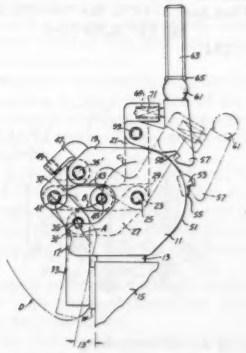
**3,920,234**
**VERTICAL LIFT TOGGLE CLAMP**

**Leland F. Blatt, 31915 Groesbeck Highway, Fraser, Mich. 48026**

**Filed Mar. 1, 1974, Ser. No. 447,093**
**Int. Cl.² B25B** *5/12*
**U.S. Cl. 269—94** **1 Claim**



1. A vertical lift toggle clamp comprising a pair of spaced upright side plates adapted for securing upon a support;
said plates including lower and upper lateral extensions with rear portions being circular;

a latch plate in a pre-set angular position along and spanning said rear portions and secured thereto;
a handle link guidably interposed between the side plates;
a first pivot between the side plates pivotally mounting the handle link intermediate its ends;
a first link between the side plates at one end pivotally connected to said first pivot;
a work securing arm guidably interposed between the side plate lower extensions and intermediate its ends pivotally connected to the other end of said first link;
a second link at one end interposed between the side plate upper extensions and pivotally mounted thereon;
a pivot interconnecting one end of the work securing arm and the other end of the second link;
a control link at one end pivoted to said work securing arm at its connection with the second link, and at its other end pivotally connected to one end of the handle link;
a latch overlying the side plates and pivotally connected to said handle link outwardly of the side plates;
said latch having a latch element adapted for securing and retaining registry with said latch plate on a predetermined retraction of said arm link;
spring means interposed between said handle link and latch normally biasing said latch clockwise;
and a handle secured to and projecting from said latch;
forward manual movement of the latch handle disengaging said latch and rotating said arm link and connected control link translating said arm for gripping a workpiece against said support;
said first link defining a first arcuate path of translation of said work securing arm, said second link defining a second arcuate path of translation of said work securing arm causing a constrained resultant path of closing and opening movements of the work securing arm, a stop arm spanning and secured to forward portions of the side plates;
and an adjustable set screw projected through said stop arm limiting movement of the second link in one direction by abutment therewith;
said set screw functioning as a prestop for said second link, whereby when the pivot between the arm link and the control link passes dead center said prestop causes tension, maintaining the clamp arm in closed and locked position.

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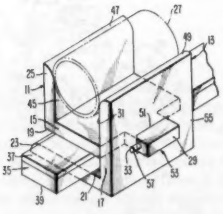
**3,920,235**

## SELF-TIGHTENING QUICK RELEASE CLAMP

**Jurgen Hermanns, Dunellen, N.J., assignor to Burroughs Corporation, Detroit, Mich.**

**Filed June 5, 1974, Ser. No. 476,678**
**Int. Cl.² B25B** *5/04*
**U.S. Cl. 269—234** **10 Claims**



**1.** A clamping device comprising:
first and second substantially L-shaped members, one leg of said first member being pivoted to one leg of said second member, a portion of said one leg of said second member extending beyond the pivot point, said one leg of said first member and the other leg of said second member forming clamping jaws having opposed surfaces to receive an article therebetween, and a surface of the other leg of said first member and a surface of said portion of said one leg of said second member being in opposed, substantially parallel, spaced-apart relationship; and
a separate freely movable wedging member for wedging insertion between and in bodily contact with the substantially parallel opposing surfaces of the other leg of said first member and said portion of said one leg of said second member, said wedging member being in free sliding longitudinal contact with and along the longitudinal dimension of said last named opposing surfaces during insertion for exerting a force therebetween affecting relative pivoting of said one leg of said first member toward said other leg of said second member while maintaining substantially parallel spaced-apart relation.

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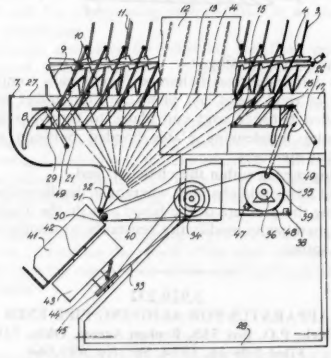
**3,920,236**

## APPARATUS FOR ARRANGING SHEETS OF PAPER IN PREDETERMINED ORDER IN SETS

**Julius Kronsved, Hagersten, Sweden, assignor to Guternic AB, Johanneshov, Sweden**

**Filed Mar. 22, 1973, Ser. No. 343,990**
**Claims priority, application Sweden, Mar. 23, 1972, 3799/72; Hungary, Jan. 23, 1973, 1136**
**Int. Cl.² B65H** *39/04*
**U.S. Cl. 270—58** **5 Claims**



**1.** Apparatus for automatically arranging sheets of paper in perdetermined order predetermined sets, comprising:
a. a plurality of substantially horizontal shelves for individually supporting a plurality of different stocks of paper standing on edge, each of said stocks comprising identical papers, said stocks being disposed in the same order as the desired order of the sheets of paper in sets,
b. a plurality of partitions (**3**) individually associated with the shelves and disposed substantially at right angles thereto in engagement with a longitudinal edge thereof, with a gap being formed between the free end of each shelf and the adjacent partition,
c. a plurality of paper-sliding means (**4**) for individually engaging the top sheet of paper in each stock and extending above the shelves and between said partitions and being displaceable between a lower and an upper position,
d. a plurality of flaps (**10**) pivoted at their lower ends and extending across one of said shelves to one of said partitions,
e. a plurality of springs (**22**) for individually engaging said flaps and urging them against said partitions,
f. a plurality of pivotal extension arms (**21**) for individually engaging said flaps for releasing the paper-sliding means when the latter reach their upper positions, in opposition to the action of said springs,

g. a pair of parallel arms (15) connected to each other and to two arcuately displaceable arms (49) for providing said parallel arms with an arcuate, substantially vertical motion, thereby causing said paper-sliding means to feed the top sheet of paper in each stock upwards,

h. a lower rack (2),

i. an upper rack (1) rigidly connected to said lower rack,

j. toothing on the face of said lower rack opposite to the upper end of said flaps for engaging the flaps and holding them away from the partitions to enable said stocks of paper to be disposed on the shelves and for permitting the top sheet of paper in each stock to be fed upwards by said paper-sliding means without frictional restraint between the flaps and the paper,

k. toothing on the face of said upper rack for engaging the upper ends of the paper-sliding means when said parallel arms are in such a position that said paper-sliding means are in their lowermost positions and out of engagement with the stocks of paper,

l. a plurality of baffles (14) forming a plurality of individual paper-conveying channels (13) and extending downwardly from the lower ends of said partitions, with substantially one baffle being located between each pair of partitions, and

m. an electromagnet (6) for actuating said lower and upper racks when the paper-sliding means reach their uppermost positions for permitting said flaps to be actuated by said springs so that said top sheets of paper when released by said paper-sliding means will slide downwards over said flaps with one sheet between each pair of baffles and will be arranged in said predetermined order in sets.

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## 3,920,237
## LAUNDRY FOLDER FOR PIECES OF VARIABLE RESILIENCE

**Frederick W. Grantham, 152 W. Pico Blvd., Los Angeles, Calif. 90015**

**Filed June 18, 1970, Ser. No. 47,188**
**Int. Cl.[2] B65H** *45/12*
**U.S. Cl. 270—62** **12 Claims**

1. In a laundry folder having an entrance end and exit end, conveyor means adapted for receiving, at the entrance end, laundry pieces to be folded and conveying them through the folder and delivering them from the exit end, means for folding the pieces in their progress through the folder,

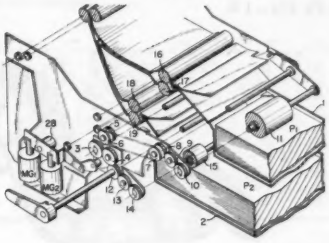
a french folder component constituting a segment of the conveyor and folding means, the french folder component including a pair of transversely spaced longitudinally extending main folding blades and a pair of forming blades thereunder, and also including a pair of auxiliary folding blades mounted on the main folding blade, and extending longitudinally along the main folding blades, and being mounted on pivoting axes at their rear end, relative to the direction of the pieces moving therealong, between an inner position in which their outer edges are substantially coincident with the outer edges of the main folding blades, and an outer position in which their outer edges diverge in a direction of the movement of the laundry piece thereover,

and means for moving the auxiliary folding blades between their inner and outer positions.

## 3,920,238
## COPY MEDIUM FEED DEVICE

**Tadayuki Kitajima, Yokohama, and Masashi Suda, Irima, both of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan**

**Filed Oct. 10, 1973, Ser. No. 404,909**
**Claims priority, application Japan, Oct. 16, 1972, 47-103467; Oct. 16, 1972, 47-119497[U]; Oct. 16, 1972, 47-119498[U]**
**Int. Cl.[2] B65H** *1/28, 3/06*
**U.S. Cl. 271—9** **10 Claims**



1. In a copy medium feed device for a copying apparatus having a copying station including a single set of feed rollers for feeding a copy medium to the copying station, said copy medium feed device comprising:

a plurality of copy medium magazines each containing copy medium; and

means for transporting a copy medium from each of said magazines to the feed rollers of the copying station;

the improvement comprising said transporting means comprising:

separate transport rollers for each said magazine for contacting the copy medium in each magazine and feeding a copy medium to the feed rollers of the copying station;

a driving source;

separate force transmitting means corresponding to each of said separate transport rollers for transmitting a rotating force to each of said separate transport rollers;

shift means including a second drive gear movable between each of said separate force transmitting means for transmitting a rotating force to a selected one of said separate transport rollers through the corresponding separate force transmitting means, and a first drive gear interrelated with said second drive gear;

a single connecting means intermittently connecting said driving source with said first drive gear and transmitting a rotating force thereto; and

passageway means for transporting copy medium from each of said magazines to the feed rollers of the copying station, said passageway means being respectively provided between the feed rollers of the copying station and each of said magazines.

5. In a copy medium feed device for a copying apparatus, said feed device including a plurality of copy medium magazines each containing copy medium and means for transporting a copy medium from each of said magazines to a copying station of the copying apparatus; the improvement comprising:

separate transport rollers for each said magazine for contacting the copy medium therein and feeding a copy medium to the copy station;

separate rocker plates each pivotable about a fixed shaft and on which each of said separate transport rollers is mounted in each of said magazines;

an opening-closing member provided in an outer casing of the copying apparatus and which is openable when loading said magazines with copy medium; and

a common connecting member rotatably engaged with each of said separate rocker plates for simultaneously pivoting said separate rocker plates and moving said separate transport rollers mounted thereon out of contact with the copy medium in each of said magazines.

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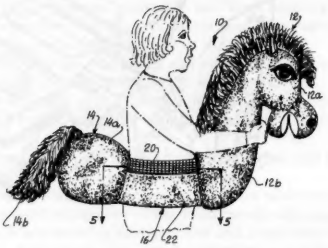
**3,920,239**
**HOBBY HORSE**

**Rod L. White, Livingston, N.J., assignor to Knickerbocker Toy Co. Inc., Middlesex, N.J.**

**Filed Nov. 25, 1974, Ser. No. 526,468**
**Int. Cl.[2] A63G *31/00*; A63H *3/02***
**U.S. Cl. 272—1 D** **1 Claim**



**1.** A stuffed hobby horse or like toy in the form of a stuffed character and adapted to be worn about the waist, said hobby horse or like toy having non-rigid structure components solely whereby injury to a child playing therewith is precluded, said hobby horse or other toy comprising:

a. a fore section consisting of the head and neck of a stuffed character,

b. a hind section consisting of the rump of a stuffed character,

c. said fore and hind sections having a flexible outer skin and a pliable inner stuffing, and

d. elastic sides joining said fore and hind sections to support them about the waist of a child,

e. said elastic sides constituting the only means joining said sections and comprising an elastic band and a gathered strip of material sewn thereto,

f. said elastic band being adapted to stretch and said gathered strip being adapted to expand to accommodate the waist of a child,

g. said fore and hind sections and said elastic sides being conformable to the contours of the child's waist completely thereabout in response to the elastic sides inwardly drawing the pliable sections against the waist of the child.

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**3,920,240**
**INCLINED PORTABLE EXERCISE FRAME**

**Cecil J. Ross, 8600 Grover Drive, El Paso, Tex. 79925**

**Filed June 6, 1974, Ser. No. 477,159**
**Int. Cl.[2] A63B *17/00***
**U.S. Cl. 272—57 R** **4 Claims**

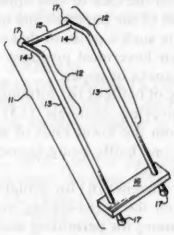
**1.** An inclined portable exercise frame designed to engage and be supported by a floor surface with the upper end of said exercise frame to be leaned against and braced by a wall such that said exercise frame forms the hypotenuse of a right triangle with said floor and wall forming the right-angled sides, said portable exercise frame comprising:

A. a pair of inclined spaced apart tubular side grip rails with each of said side rails having

1. a straight lower side rail section with its bottom end adapted to engage and be supported by a floor surface, and

2. a stand-off strut support at the upper terminal end of each said side rail formed by bending forward at an obtuse angle a portion of each of said side rails equal to approximately one-tenth to one-fifth of the length of said side rails with the upper terminal end of each of said stand-off strut extensions of the side rails being provided with friction means of engaging a wall for support without marring the wall;

B. a single flat oblong foot support board transversely mounted between said spaced apart side rails at an intermediate point near the lower end of said side rails, and so positioned with respect to the inclined side rails when the exercise frame is leaned in operative position against a support wall, that the top surface of said foot support board is in substantially a horizontal parallel position with respect to the floor on which the exercise frame is standing;



C. an upper transverse cross-brace connected between the spaced-apart side rails at an intermediate point from the upper end of each of said spaced apart side rails at a point near the obtuse bend that forms the stand-off strut supports in each of said side rails to impart strength and rigidness to said exercise frame; and

D. said foot support, said cross-brace, and said tubular side grip rails enclosing a space which is free of obstructions whereby a user, when standing on said foot support and gripping said rails, may exercise freely and unconstrained, within said space.

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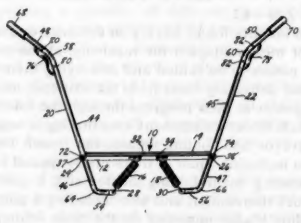
**3,920,241**
**EXERCISER**

**Marcel Belkir, 1701 York Ave., Apt. 25C, New York,, N.Y. 10028**

**Filed Nov. 6, 1974, Ser. No. 521,296**
**Int. Cl.[2] A63B *23/04*, *21/00***
**U.S. Cl. 272—83 R** **3 Claims**



**1.** In an exerciser of the type including an elongated crossbar, first and second arms pivotally connected to said crossbar, substantially at the ends thereof, each arm having and upper and a lower arm portion, and resiliently resistive means interconnected to said lower arm portion, the improvement comprising: said crossbar having first and second members defining an elongated recess therebetween, said arms being interconnected within said recess, each of said members having a pair of longitudinally extending slots and laterally ex-

tending notches communicating with said slots, the slots in said first and second members being aligned; first and second springs each having a first end thereof interconnected to the end of a lower arm portion, and a second end forming a loop; a cylindrical collar disposed within said loop, and means penetrating said collar and slidably movable within a pair of aligned slots for selective engagement with a pair of aligned notches; whereby the effective spring tension in said springs for any given position of said arms relative to said crossbar may be determined by the particular notches so engaged.

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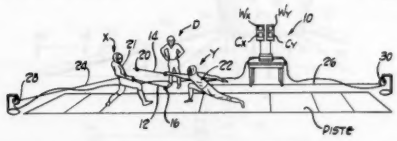
**3,920,242**

**ELECTRICAL FENCING SCORING METHOD AND APPARATUS**

**William E. Reith, 1677 Eddington Road, Cleveland Heights, Ohio 44118, and John A. Overman, 252 North, Chagrin Falls, Ohio 44022**

**Filed Mar. 25, 1974, Ser. No. 454,179**
**Int. Cl.[2] A63B** *69/02*
**U.S. Cl. 273—1 F** **10 Claims**



**7.** An electrical apparatus for scoring fencing matches in response to first and second valid touch signals and invalid touch signals produced by execution of first and second valid and invalid touches with fencing weapons, said apparatus comprising:

a. an invalid touch indicator;

b. first and second valid touch indicators;

c. an indicator control circuit comprising:

i. first means for actuating said first valid touch indicator in response to a first valid touch signal,

ii. second means for actuating said second valid touch indicator in response to a second valid touch signal,

iii. a first delay circuit producing an output signal capable of actuating the invalid touch indicator upon a predetemined time lapse after the initiation of an input signal thereto;

iv. first control means for initiating said input signal to said first delay circuit in response to selected first valid touch signals, and

v. second control means for selectively directing said output of said first delay circuit to disable said second means from actuating said second valid touch indicator in response to said second valid touch signals following said predetemined time lapse.

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**3,920,243**

**SIMULATED SOCCER GAME APPARATUS**

**Astrogildo Santos, Sr., 20301 Cantara St., Canoga Park, Calif. 91306**

**Filed Dec. 9, 1974, Ser. No. 530,689**
**Int. Cl.[2] A63F** *7/06*
**U.S. Cl. 273—85 F** **1 Claim**

**1.** Game apparatus comprising:

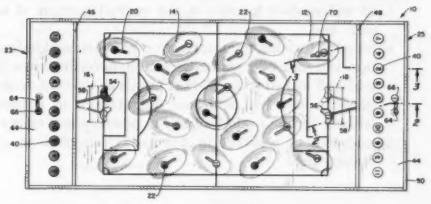
a housing;

a playing surface formed upon said housing having a goal section located at each longitudinal end of said surface; a plurality of spaced apart recesses formed within said playing surface, there being a predetermined number of said recesses located in precise locations about said surface;

a playing member positioned in each said recess, each said playing member being movable with respect to said playing surface between a retracted position and an extended position;

an actuating means mounted on said housing and connected to each said playing member with there being an actuating means for each said member, said actuating means being manually actuatable to cause movement of its respective playing member, a first plurality of said actuating means mounted at one end of said longitudinal playing surface with the second plurality of said actuating means mounted at the other end of said longitudinal playing surface;

a spherical playing object locatable upon said playing surface, said playing object capable of coming to rest within any of said recesses;



each said actuating means including a longitudinal rod connected to a plate, said plate being pivotally mounted upon an upright member with the pivot piece being substantially centrally located with respect to said plate, said upright member being attached to said housing, a spring interconnecting the aft end of said plate and said upright member, said spring functioning to exert a continuous bias upon said plate so that said playing member is caused to be normally positioned in said retracted position, each said actuating means including a plunger pivotally connected to the fore end of said plate, said plunger to be manually depressed which causes pivoting of said plate and lineal movement of said longitudinal rod and propelling of the spherical playing object on said playing surface.

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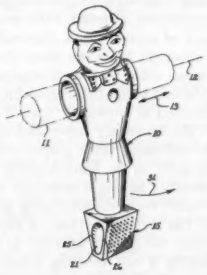
**3,920,244**

**TABLE TOP GAME FIGURE**

**Robert B. Kaiser, Phoenix, Ariz., assignor to Mirco Games, Inc., Phoenix, Ariz.**

**Filed May 23, 1974, Ser. No. 472,856**
**Int. Cl.[2] A63F** *7/10*
**U.S. Cl. 273—85 D** **1 Claim**



**1.** In a table top game of the type having a playing deck defining a playing field, a ball movable on said playing field, a goal contiguous to said playing field into which said ball may be moved, a plurality of figures for striking said ball to impart movement thereto, and a plurality of rotatable shafts mounted transversely over said playing field and being both rotatable

about their respective axes and slidable along said axes, said figures being secured to said shafts causing each said figure to be rotatable about the axis of said shaft to which it is respectively secured and slidable along said axis, said figures each having a foot portion at a distance from said shaft for striking said ball, wherein the improvement comprises a foot portion including:

a. a pair of substantially planar faces, each parallel to the axis of the shaft to which said figure is secured and canted relative to each other so that the distance between the faces increases as the distance from said shaft decreases; and

b. a pair of substantially planar sides, each perpendicular to the axis of the shaft to which said figure is secured and parallel to each other, each of said sides having

i. an indentation located at the central portion of said side; and

ii. an edge forming the intersection between said indentation and said side, said edge simultaneously contacting said ball at two spaced apart points to prevent contact between said ball and said indentation, to impart a striking force to said ball and to produce movement of said ball in a direction generally transverse to said playing field.

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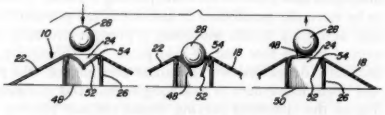
**3,920,245**
**BALL GAME**

**Roger L. Gothreaux, and Louie A. Campbell, both of 709 Omega, Lafayette, La. 70501**

**Filed Dec. 13, 1973, Ser. No. 424,603**
**Int. Cl.[2] A63B** *71/02*
**U.S. Cl. 273—95 H** **1 Claim**



1. A game adapted to be played on a playing field or the like comprising goal means, boundary means encircling the goal means and team position indicating means disposed outwardly of the boundary means to indicate the position of team members prior to play of the game and position of inactive team members when playing a game, said goal means including an upwardly opening ball receiving pocket therein, and a ball to be manipulated by the players of each team for scoring points when positioned in the pocket, said goal means being in the form of a pyramidal member having four equal sides with each side being distinguishably colored, said boundary means including four ropes of equal length disposed parallel to and equally spaced outwardly from the sides of the goal with the ropes being the same color as the corresponding sides of the goal, said team position indicating means including a plurality of short ropes oriented in outwardly spaced parallel and centered relation to the boundary ropes and being correspondingly colored for indicating team player positions, said balls being colored the same as the team position indicating ropes, said pyramidal member having a truncated apex, said pocket extending downwardly from the truncated apex thus requiring that a ball roll up the inclined surface of the pyramidal member or be lofted into the pocket in order to score a goal, said goal means including a ball ejecting means disposed in the pocket for ejecting a ball which has scored a goal, said ball ejecting means including a resilient member tensioned into retracted position and held in retracted position by trigger means, said trigger means being disposed for engagement by a ball entering the pocket for releasing the tensioned resilient member for ejecting the ball upwardly out of the pocket, said resilient member being in the form of a leaf spring anchored at one end to an upper end portion of the pocket, said trigger means including a trigger member pivotally connected to an opposite side of the pocket and having a free end overlying the free end of the spring when tensioned by flexing downwardly into the pocket, said trigger member being engaged by the ball entering the pocket for disengaging the free end thereof from the spring.

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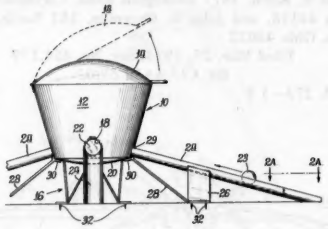
**3,920,246**
**BALL TARGET GAME**

**Agripin Contreras, 2226 S. Albany, Chicago, Ill. 60623**

**Filed Oct. 2, 1974, Ser. No. 511,444**
**Int. Cl.[2] A63B** *71/04, 57/00*
**U.S. Cl. 273—127 R** **3 Claims**



1. A game adapted for use on a playing surface, comprising a bucket having a circumferential body portion and a bottom wall; a plurality of circumferentially spaced openings in the body portion adjacent said bottom wall; a separate ramp assembly for each opening, each ramp assembly including a ramp extending angularly upward from the playing surface, a bracket adapted to support the ramp, a horizontally disposed support arm at the upper end of the ramp, each of said ramps communicating with an associated opening when the bucket is placed on and is supported by said support arms; and a plurality of balls moveable by a plurality of players up said ramps and through associated openings into the bucket, said bucket being of a size to hold a plurality of said balls simultaneously.

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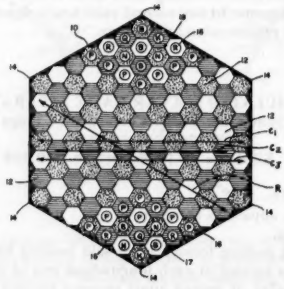
**3,920,247**
**CHESS GAME APPARATUS**

**Daniel T. Jenkins, P.O. Box 2013, Olympia, Wash. 98507**

**Continuation-in-part of Ser. No. 368,129, June 8, 1973, abandoned. This application June 10, 1974, Ser. No. 477,733**
**Int. Cl.[2] A63F** *3/02*
**U.S. Cl. 273—131 AB** **2 Claims**



2. A game apparatus comprising a gameboard having an equilateral hexagonal array of playing spaces of substantially uniform size delineated on a surface thereof, all of the playing spaces being of equilateral hexagonal configuration, each

playing space being contiguous entirely along each of its edges with all next adjacent playing spaces, the array being comprised of a plurality of parallel chains of said playing spaces, the array having seven playing spaces forming each edge of the array, and differentiating means for differentiating playing spaces in one chain from playing spaces in next adjacent chains, the differentiating means comprising a regularly alternating three-color pattern, every third chain in the array of chains being the same color and the playing spaces at all the vertices of the array of playing spaces being all of the same color, and at least two visually distinguishable sets of playing pieces, each piece being of a size to be received within one of said spaces.

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**3,920,248**

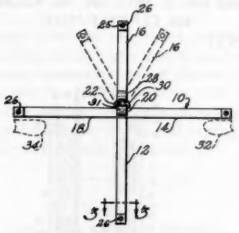
**GOLF CLUB SWING TRAINING DEVICE**

**J. Kenneth Medders, P.O. Box 143, Resaca, Ga. 30735**

**Filed Oct. 21, 1974, Ser. No. 516,444**

**Int. Cl.[2] A63B** *69/36*

**U.S. Cl. 273—186 C** **7 Claims**



1. In a golf training and/or practice device:

a plurality of elongated golf practice members extending in different directions from the junction of said members, a golf ball positioned at said junction, said golf practice members being positioned substantially flat against a practice surface to extend from said junction, one of said golf practice members being adjustable in direction from one side to the other over said surface with respect to the junction whereby adjustments may be made in the direction of the swing of a golf club swung by a user to indicate a hook or slice, another of said golf practice members indicating the location of the user's foot and approximate distance from the center, and another of said members indicating the follow through from the direction of swing along the adjustable member.

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**3,920,249**

**PICKUP GUIDANCE MECHANISMS**

**Richard Wykeham Beaufoy Birch, Strelley Barn, Woodham, Mortimer, Maldon, Essex, England**

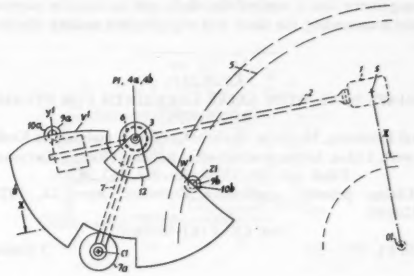
**Division of Ser. No. 236,911, March 22, 1972, Pat. No. 3,826,505. This application May 16, 1974, Ser. No. 470,529**

**Claims priority, application United Kingdom, Mar. 25, 1971, 7821/71**

**Int. Cl.[2] G11B** *3/38*

**U.S. Cl. 274—23 A** **7 Claims**

1. A pickup guidance mechanism for gramophone disc records, comprising a pickup which can receive a stylus for engaging a groove on a record; a straight arm on which the pickup is carried for guidance across the record without geometric side pressure acting on the stylus and pivoted about an axis for rotation in a plane parallel to the record; a slave arm pivoted for rotation in a plane parallel to the record about an axis which is fixed, said slave arm carrying the pivot of said straight arm; straight arm position sensing means having a first element formed with an edge located in a plane parallel with the record and a sensing element adapted to produce a command signal and which co-operates with said edge of the first element wherein, one of said elements is fixed relatively to the straight arm and the other fixed relatively to the record rotation axis and, throughout a traverse by the pickup of a record groove, the sensing element co-operates with the edge of the first element on the side of the slave arm on which the record center is located, the shape of the edge of the first element



being such that during traverse by the pickup of a record groove the second or sensing element produces the command signal upon departure of the straight arm from the position thereof corresponding with zero tracking error; and correcting means responsive to said command signal and adapted to effect movement of the slave arm and hence of the pivot of the straight arm, thereby to move the straight arm towards the position thereof corresponding with zero tracking error.

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**3,920,250**

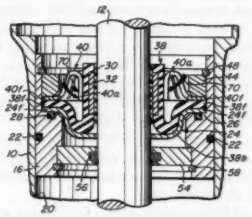
**HIGH PRESSURE SHAFT SEAL STRUCTURE**

**Phillip R. Eklund, 991 Stanwick Drive, Dayton, Ohio 45430**

**Filed Feb. 19, 1974, Ser. No. 443,471**

**Int. Cl.[2] F16J** *15/16;* **F16K** *41/00*

**U.S. Cl. 277—51** **5 Claims**



1. An improved high pressure seal assembly comprising a wall having a circular opening therein, a shaft which is adapted for reciprocal and/or rotatable movement within said opening in said wall, a cylindrical engagement sleeve of anti-friction material mounted on the shaft and in sliding engagement therewith, a cylindrical expansion sleeve of rigid metallic material surrounding the engagement sleeve of anti-friction material and bonded thereto, the expansion sleeve having an axial length less than the axial length of the engagement sleeve so that opposed axial end portions of the engagement sleeve extend beyond corresponding end portions of the expansion sleeve, the expansion sleeve having a plurality of axially extending slots therein which are open at alternatingly opposite ends of the expansion sleeve, a sealing sleeve of elastomeric material having a cylindrical portion surrounding the expansion sleeve and bonded thereto, the cylindrical portion of the sealing sleeve having a part engaging the engagement sleeve at each axial end portion of the expansion sleeve so that the expansion sleeve is enclosed by the engagement sleeve and the sealing sleeve, the sealing sleeve having a flange portion ex-

tending from the cylindrical portion, means within said opening and connecting said flange portion to said wall, a pressure member surrounding the cylindrical portion of the sealing sleeve and having an annular outwardly projecting flange, the pressure member having a series of U-shaped resilient fingers extending from the annular flange and engaging the cylindrical portion of the sealing sleeve and urging the cylindrical portion of the sealing sleeve and the expansion sleeve and the engagement sleeve toward the shaft, and an annular support plate surrounding the shaft and engaging the sealing sleeve.

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**3,920,251**

## SHAFT SEAL WITH AXIAL LABYRINTH FOR STEAM TURBINES

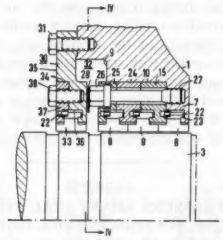
**Axel Remberg, Mulheim (Ruhr), Germany, assignor to Kraftwerk Union Aktiengesellschaft, Mulheim (Ruhr), Germany**

**Filed Apr. 23, 1974, Ser. No. 463,383**

**Claims priority, application Germany, Apr. 24, 1973, 2320691**

**Int. Cl.[2] F16J** *15/48*

**U.S. Cl. 277—53** **3 Claims**



1. Shaft seal means for steam turbines comprising:

an axially unitary housing having an end face and formed with a shaft bore-hole, a recess extending from said shaft borehole, a recess extending from said end fall in an axial direction and open towards said shaft bore-hole, and a plurality of mutually adjacent circular slots communicating with said recess and said bore-hole;

a plurality of labyrinth seals receivable in said slots, respectively each of said seals comprising a plurality of ring segments, mutually in contact with each other in circumferential direction; and

a plurality of fitting piece means for closing said recess upon selective filling of said slots with said fitting-piece means, each of said fitting-piece means having a hammer-head and being shaped to conform substantially to the contour of said recess and said slots.

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**3,920,252**

## DYNAMIC SEAL FOR DOUBLE-ACTING PISTON

**Jacques Dechavanne, 35 rue de Franceville, 93220 Gagny, France**

**Filed May 21, 1974, Ser. No. 471,909**

**Claims priority, application France, May 21, 1973, 73.18448**

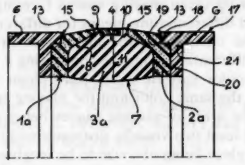
**Int. Cl. F16j** *15/24*

**U.S. Cl. 277—188** **6 Claims**

1. A seal for a piston slidable in a cylinder and separating a pair of chambers under pressure, said seal comprising:

a pair of like single-lip cup packings of generally L-section arranged parallel to each other and having their single lips directed toward each other, said packings being constituted of a fabric-reinforced elastomer; and

a core ring axially aligned between and bonded to said packings, said ring being unreinforced and having a smaller modulus of elasticity than said cup packings, said



core ring having a base of its maximum axial thickness adapted to press against the piston.

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**3,920,253**

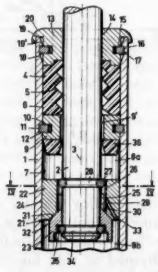
## NON-LEAKING GAS SPRING

**Fritz Bauer, Schulzstr. 14, 8503 Altdorf near Nuremberg, Germany**

**Filed Dec. 2, 1974, Ser. No. 528,689**

**Int. Cl.[2] F16J** *15/18*

**U.S. Cl. 277—187** **7 Claims**



1. In a gas spring comprising a housing made of a slender cylindrical tube; a piston rod mounted coaxially in said housing and protruding out of one end of said housing; a guide piston supported by said piston rod and positioned for axial movement in said housing; a multi-lip annular seal fastened axially in said housing at the end thereof from which said piston rod emerges, said seal resting against the piston rod, the internal end face of said seal having a fastening element and the outer end face having a guide element, the improvement wherein

the internal wall of said housing is provided with two grooves at a preset distance, said gas spring further comprising a pair of rings each fitting into a corresponding annular recess in said guide element and in said fastening element, with at least the ring associated with said fastening element being a snap ring.

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**3,920,254**

## PISTON OR LIKE SEALING OR PACKING

**David E. Johnston, Gosforth Newcastle-upon-Tyne, and Denis Wallace, Durham, both of England, assignors to George Angus & Company Limited, England**

**Filed Sept. 27, 1974, Ser. No. 509,748**

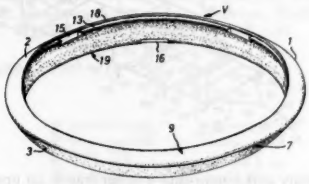
**Claims priority, application United Kingdom, Oct. 12, 1973, 47789/73**

**Int. Cl.[2] F16J** *15/32*

**U.S. Cl. 277—206 R** **7 Claims**

1. A sealing ring, for use as a fluid packing in a circumferential groove in one of opposed cylindrical surfaces to be sealed, comprising a moulded ring of elastomeric material with inner and outer circumferential sealing contact bands to seal against

opposed surfaces, the sealing ring being substantially of V-shape in radial axial section, so that it has a radially-directed apex portion forming a circumferential sealing contact band at one radial periphery of the ring, as viewed in said radial axial section, and a pair of oppositely obliquely-inclined circumferential flanges which diverge from the apex portion and extend to further peripheries at the other radial periphery of



the ring opposite from said one radial periphery, each said flange having on the axially outer side thereof a lateral, axially-directed, sealing contact band near the said further periphery of its respective flange, and wherein each said flange has open recesses through the radial edge of its respective further periphery beyond its respective lateral sealing contact band for axial passage of fluid past the flange.

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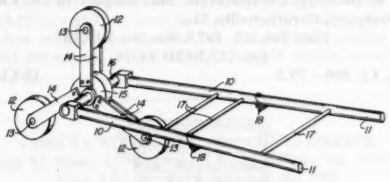
## 3,920,255
## LOAD CARRYING DEVICE

**Richard D. Siddoway, 803 Claybourne Ave., Salt Lake City, Utah 84106**

**Filed Sept. 9, 1974, Ser. No. 504,136**
**Int. Cl.² B62B 5/02**
**U.S. Cl. 280—5.26** **9 Claims**



**1.** A lightweight load-carrying device for transporting heavy loads over rugged terrain comprising:

a. a substantially flat, load-supporting frame having handle members at one end, said frame constructed of tubular members;

b. a main axle supporting the frame at the end opposite said handle members;

c. three load supporting legs of substantially the same length rotatably attached at one end of each of the legs to said main axle centrally between the ends thereof, said legs being substantially equiangularly spaced from one another, substantially perpendicular to the flat tubular frame and substantially on the center line of said flat, tubular frame;

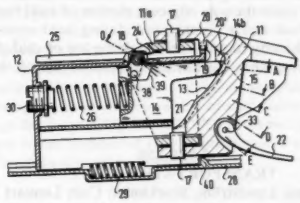
d. a wheel rotatably attached to the free end of each leg; and

e. a fillet rigidly spacing adjacent pairs of legs.

## 3,920,256
## SAFETY SKI BINDING

**Brigitte S. Sittmann, Stuttgart, Germany, assignor to Vereinigte Baubeschlagfabriken Gretsch & Co., GmbH, Leonberg, Germany**

**Filed July 30, 1974, Ser. No. 493,086**
**Claims priority, application Germany, Aug. 9, 1973, 2340419**
**Int. Cl.² A63C 9/08**
**U.S. Cl. 280—11.35 T** **14 Claims**



**1.** A safety ski binding having a hollow boot fastener adapted to be swung upwardly out of a normal boot fastening position about a transverse shaft and laterally about a vertical shaft counter to arresting forces, an arresting surface provided on the inside on said boot fastener, an arresting member cooperable with said arresting surface, spring means biasing said member in the direction of the boot into engagement with said arresting surface, said arresting surface having a plurality of vertical arresting cams which rise to a vertical release point during a vertical movement relative to the arresting member and superimposed also a plurality of lateral arresting cams which rise to lateral release points during a lateral movement relative to the arresting member, the lateral arresting cams having centers of curvature located on the side of the arresting surface towards the boot, and said arresting member having two arresting projections movable into engagement with the arresting surface on both sides of a central longitudinal plane thereof when the boot fastener is in a central position.

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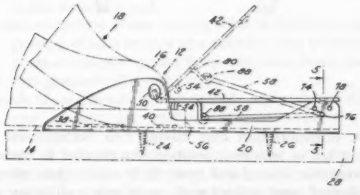
## 3,920,257
## CROSS-COUNTRY TYPE SKI BINDING SYSTEM

**Wilhelm Fredriksen, 19972 Mitchell, Detroit, Mich. 48234**

**Filed Jan. 17, 1975, Ser. No. 541,852**
**Int. Cl.² A63C 9/00**
**U.S. Cl. 280—11.35 B** **5 Claims**



**1.** Improvement in a cross-country type ski binding consisting of a toe iron, a clamp member and a lock member for said clamp member both pivotally mounted via longitudinally spaced apart respective stationary pivot axes, said improvement comprising said clamp member which comprises a relatively broad lever having a clamp element adjacent one end thereof, said one end including two opposite transversely extending portions journalled on said toe iron to define the stationary pivot axis for the clamp member to move from a lowered, forwardly extending clamping position in which the clamp element presses down upon the sole adjacent the toe of the ski boot for clamping the latter in said toe iron and a raised upwardly extending release position in which the ski boot is

released from said toe iron, the lock member being positioned ahead of said clamp member, said lock member being a spring wire bail, said lock member being pivotally mounted as aforesaid, the rearward end of the lock member being pivotally attached to a forward portion of the clamp member to define a pivot axis which moves downwardly over-center of an imaginary line through the two stationary pivot axes defined by the pivotal mountings of the clamp member and lock member during movement of said clamp member from its released position to its clamping position to thereby lock the clamp member in its clamping position where said clamp element presses down upon the sole adjacent the toe of a ski boot, said spring wire bail being compressed during said over-center movement whereby to positively lock the toe of said ski boot in said toe iron while permitting maximum lift of the heel thereof.

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**3,920,258**

**TRANSPORTATION CART**

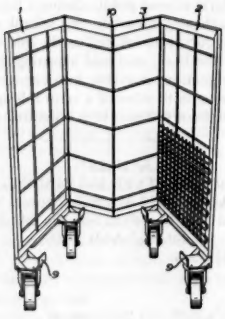
**Rickard Verner Lundström, Stockholm; Curt Lennart Lagerström, Huddinge, and Gunnar Savås, Vallingby, all of Sweden, assignors to Kommanditbolaget Rigulag AB & Co., Stockholm, Sweden**

**Filed Sept. 24, 1973, Ser. No. 400,350**

**Claims priority, application Sweden, Sept. 28, 1972, 12531/72; Nov. 10, 1972, 14626/72**

**Int. Cl.² B62B** *3/02*

**U.S. Cl. 280—33.99 H** **6 Claims**



**1.** A transportation cart having two vertical side walls which, when in operative position, are parallel to each other and swingable toward and away from each other, along one edge thereof, and a third wall, each side wall being rigidly connected to one half of the third wall, said halves of said third wall-being hingedly connected along the edge opposite to the edge which is connected to said side walls, said cart having wheel means for transportation of said cart, means for providing a bottom swingably mounted on one of said vertical side walls, each of said wheel means being mounted in a corner at the underside of said walls, each side wall carrying one of said wheel means at the furthest moving corner, and means for locking said swingable side walls in cooperative relation with said bottom when the latter is in its horizontal position, said said cart being insertable in a like cart for storage when the cart is in an upright position with the bottom in a vertical position.

**3,920,259**

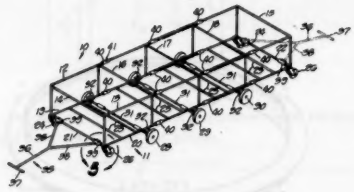
**UTILITY CART**

**Mamon Daniel Graham, 1923 West Boulevard, Los Angeles, Calif. 90016**

**Filed Nov. 25, 1974, Ser. No. 526,765**

**Int. Cl.² B62B** *3/00*

**U.S. Cl. 280—47.34** **9 Claims**



**1.** A utility cart comprising a lower frame, an upper frame superimposed above and spaced from the lower frame and connected thereto by plurality of spaced connecting members, said frames each being constructed of a plurality of interconnectable sections, said upper frame having a plurality of spaced openings therein sized for holding individual containers to be transported from one location to another, the lower frame having elongated support members disposed beneath said openings, a plurality of support wheels connected to and disposed beneath said lower frame supporting said frames above the ground, and a transport handle connected to one of said frames, each said section of said cart comprising:

a. a separate and integral rigid unit which includes members forming a part of said upper frame;

b. members forming a part of said lower frame including some said support members;

c. connecting members rigidly connecting said members forming a part of said upper frame to said members forming a part of said lower frame; and

d. some said support wheels.

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**3,920,260**

**CART SHELF SUPPORTING STRUCTURE**

**Joe R. Downing, Caruthersville, Mo., assignor to The Colson Company, Caruthersville, Mo.**

**Filed Feb. 12, 1975, Ser. No. 549,187**

**Int. Cl.² B62D** *53/06*

**U.S. Cl. 280—79.3** **10 Claims**

**1.** In a cart having a wheeled base defining spaced uprights at the sides of the cart, and a shelf member, structure for adjustably supporting the shelf member on said uprights for selectively defining a horizontal support shelf and a vertical side retainer wall comprising:

means defining slide supports;

means defining elongated slides on the shelf member extending in a width direction of the shelf member and slidable one each through said slide supports;

means for pivotally mounting said slide supports one each to the uprights at one side of the cart for pivoting about a horizontal axis perpendicular to the side-to-side direction of the cart whereby the shelf member may be pivoted

about said axis and translated perpendicular to said axis; and

means for retaining the shelf member selectively in a horizontal position across the cart from side-to-side thereof to define a horizontal support shelf across the cart, or in a vertical position at said one side of the cart to define a vertical retainer wall along said one side.

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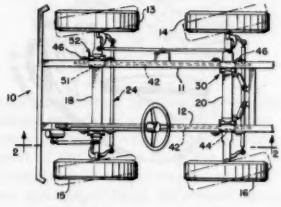
**3,920,261**

## TORSION BAR STEERABLE BOGIE SUSPENSION

**Svein Ellingsen, Kirkland, and Allan D. McLean, Seattle, both of Wash., assignors to Paccal Inc., Bellevue, Wash.**

**Filed July 5, 1974, Ser. No. 485,939**
**Int. Cl.² B60G *11/20***
**U.S. Cl. 280—81.5** **5 Claims**



**1.** A steerable double-axle bogie for a rubber tire vehicle having a frame, forward and rear axles on the forward end of the frame, at least two rubber tire wheels on each axle, and means for steering the wheels simultaneously, the improvement comprising torsion rod spring means for resiliently connecting each of the axles to the frame, said torsion rod spring means including torsion rods and linkage means for actuating said torsion rods, said actuating linkage means providing limited relative lateral movement between the frame and each axle and thus between the forward and rearward axles to compensate for side forces on the tires due to tolerance errors in the steering geometry, said actuating linkages each including a torsion crank, a shackle link and an axle perch, said torsion crank being locked to said torsion rod at one end and pivotally secured to said shackle link at the opposite end, said perch being rigidly secured to an axle and pivotally secured to the free end of said shackle link and wherein vertical and lateral movement of said axle pivots said torsion crank for springing.

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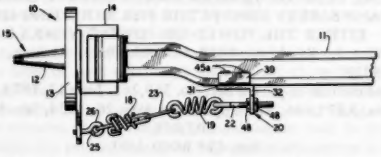
**3,920,262**

## VEHICLE STEERABLE WHEEL STABILIZER

**George M. Shaw, 1500 Sylvester Road, Albany, Ga. 31705**

**Filed Apr. 22, 1974, Ser. No. 462,733**
**Int. Cl.² B62D *7/00***
**U.S. Cl. 280—94** **2 Claims**



**1.** In a steerable vehicle suspension system of the type including at least one rotatable wheel mounted on a spindle and pivotal about a generally upright axis, the vehicle including a frame with a frame member of approximately I-shaped cross sectional shape and including a vertical web and an enlarged lower portion extending toward the wheel, the combination therewith of a tension spring assembly connected at one of its ends to the wheel spindle and at its other end to said frame member and including a clamp comprising a base plate positionable beneath the frame member and of a width wider than the frame member and a pair of L-shaped clamp elements each including an upwardly extending leg braced at its lower end against said base plate and extending upwardly from said base plate and a lateral leg projecting from the upper end of said upwardly extending leg and projecting laterally inwardly over the enlarged lower portion of said frame member and toward the vertical web of said frame member, said base plate defining openings therethrough at opposite sides thereof spaced apart a distance further than the width of the enlarged lower portion of said frame member, and the lateral leg of each of said clamp elements defining openings therethrough, and bolts extending through the openings in said base plate and the openings of the lateral leg of said clamp elements for drawing the lateral leg of said clamp elements against the enlarged lower portion of said frame member and tightening said clamp on said frame member.

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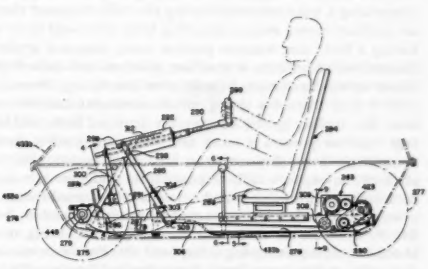
**3,920,263**

## OCCUPANT-PROPELLED VEHICLE

**Robert L. Bundschuh, assignor to Lionel C. Martin, both of West Simsbury, Conn. and Mitsui Mining & Smelting Co., Ltd., Tokyo, Japan**

**Filed Mar. 6, 1973, Ser. No. 338,643**
**Int. Cl.² B60G *1/04*; B62D *21/00***
**U.S. Cl. 280—106** **8 Claims**



**1.** In an occupant-propelled vehicle, the combination of

a rigid frame comprising

an elongated, central, longitudinally extending main frame member, and

rigid transverse frame means secured rigidly to one end portion of said main frame member and including end portions equally spaced from said main frame member; two generally flat brackets,

each of said brackets being rigidly secured to a different one of said end portions of said transverse frame means,

each of said brackets having an axle-accommodating opening and said brackets being rigidly supported by said transverse frame means in locations such that said axle-accommodating openings are coaxially aligned transversely of the frame;

first and second antifriction rotary bearings each mounted on a different one of said brackets and having their rotational axis coaxially aligned transversely of the frame;

third and fourth antifriction rotary bearings;

mounting means rigidly secured to said main frame member in a location adjacent said transverse frame means,

said third and fourth antifriction rotary bearings being mounted by said mounted means in coaxial alignment with said first and second bearings;

two mutually independent axles,

each of said axles having its inner end portion journalled in a different one of said third and fourth bearings,

said axles each extending outwardly through the corresponding one of said first and second bearings and having its outer end located outboard of the corresponding one of said brackets;

two wheels each fixed to the outer end of a different one of said axles; and

a body shell secured to said brackets.

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**3,920,264**

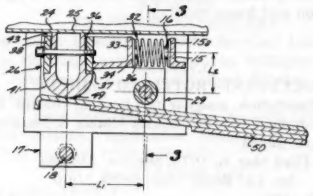
**VEHICLE LOW-LOAD ISOLATOR SPRING SUSPENSION APPARATUS**

**James W. Lafferty, 11122 Wright Road, Lynwood, Calif. 90262**

**Filed Nov. 13, 1974, Ser. No. 523,347**

**Int. Cl.[2] B60G** *11/36*

**U.S. Cl. 280—124 R** **14 Claims**



**1.** A vehicle low load isolator spring suspension apparatus comprising a yoke assembly having pivotally mounted therein an auxiliary spring means actuating lever arm, said lever arm having a lever arm reaction portion being disposed upwardly thereon with respect to a lever arm pivot means and comprising an upward extension of said lever arm having thereon on a front face thereof a spring means abutment member, said lever arm further having backwardly disposed from said lever arm reaction portion a lever arm force application portion being backwardly disposed from said pivot means, said yoke assembly having forwardly disposed from said lever arm spring means abutment member and being axially aligned therewith, a stationary yoke spring means abutment member being fixedly attached to said yoke assembly, said spring means abutment members having interposed therebetween an auxiliary spring means providing a force directed backwardly from said stationary yoke spring means abutment member and against said lever arm spring means abutment member thereby forcing said lever arm force application member to pivot downwardly within said yoke assembly, said lever arm force application portion having on a rearward end thereof a wear block member being upwardly and downwardly movable within a rear portion yoke assembly vehicle unsprung mass suspension member insertion member, said insertion member having on a top portion thereof an upper lever arm stop member and on a lower portion thereof a lower lever arm stop member and intermediate therebetween and being disposed downwardly with respect to said wear block member a vehicle unsprung mass suspension member insertion portion, said wear block having a lower surface thereof comprising a vehicle unsprung mass suspension member abutment means for abutting against said suspension member upper rearward surface when said apparatus is installed on a vehicle, said suspension member being free to move in a direction parallel to a longintudinal axis of the vehicle and upwardly and downwardly with respect to said vehicle frame member within said yoke assembly rear portion limited by said wear block abutment surface and said lower lever arm stop member, said suspension member supplying an upward force against said wear block abutment member and thereby to said lever arm force application portion, the yoke assembly having on a top portion thereof a vehicle sprung mass portion frame member mounting means for mounting said apparatus to a frame member of said vehicle sprung mass portion, said portion comprising the vehicle body and parts connected to an upper portion of a suspension means, said apparatus to be mounted above a rearward portion of a rear portion of a vehicle suspension member.

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**3,920,265**

**DEVICE IN CONNECTION WITH ROLLER SAFETY BELTS OR SIMILAR**

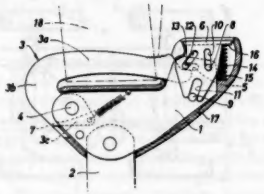
**Karl Erik Nilsson, Roentgenstrasse 30, D-8012 Ottobrunn, Munich, Germany**

**Filed Sept. 19, 1973, Ser. No. 398,764**

**Claims priority, application Sweden, Sept. 25, 1972, 12345/72**

**Int. Cl.[2] B60R** *21/10*

**U.S. Cl. 280—150 SB** **1 Claim**



**1.** A coupling device for use with vehicle roller safety belts particularly of the three point type having a chest band part which extends diagonally in use and continues in a hip-band part with both parts at the point of passing from one part to other are laid around a bar located at one side of a seat of the vehicle and fastened to the vehicle, said coupling device comprising a fitting attachable to the vehicle, a shaft being mounted on said fitting, said bar being pivotally mounted on said shaft with said bar extending perpendicular to said shaft, said bar having a bridge-shaped portion positioned for at times extending over said fitting, a locking element pivotally mounted on said fitting, a pin moveably mounted on said fitting and extending perpendicular to said bar and substantially parallel to the pivoting axis of said bar and positioned for engaging and retaining said bridge portion when extending over said fitting, said locking element being positioned for moving said pin to and from its bar retaining position during the pivoting of said locking element and resilient means tending to retain said locking element in its position with said pin engaging said bar, said fitting having a slot extending in the longitudinal direction of said bar when said bar extends over said fitting, said locking element having a slot extending at an angle to said first mentioned slot, said pin extending through both said slots whereby said pin can be displaced between its bar retaining position to its bar releasing position during pivoting of said locking element.

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**3,920,266**

**DUAL PURPOSE TRAILER SWAY CONTROL DEVICE AND SAFETY CONNECTOR FOR MOUNTING ON EITHER THE TOWED OR TOWING VEHICLE**

**William L. Rendessy, 8028 N. 14th Place, Phoenix, Ariz. 85020**

**Continuation-in-part of Ser. No. 369,263, June 12, 1973, Pat. No. 3,871,686. This application Aug. 20, 1974, Ser. No. 502,058**

**Int. Cl.[2] B60D** *1/00*

**U.S. Cl. 280—446 B** **23 Claims**

**1.** A sway control device adapted for mounting onto the rear portion of a towing vehicle provided with a pivotal hitch connection connectable to a coupler provided for the tongue of a trailer comprising in combination:

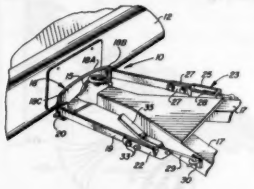
a curved guiding surface adapted to be secured to said towing vehicle adjacent to said pivotal hitch connection

comprising a convex configuration at least partially surrounding the pivotal hitch connection of the towing vehicle,

said curved guiding surface containing the coupler to limit its forward and lateral movement and having curved portions laterally positioned an equal distance on each side of said pivotal hitch connection,

a flexible connector comprising first and second ends and an intermediate portion,

said first and second ends adaptedly securable to opposite sides of the tongue of the trailer,



said intermediate portion adapted to cooperatively engage the external surface of said curved guiding surface in a taut manner to cause frictional damping thereon and limit movement of the coupler from the area of said pivotal hitch connection in the event said coupler accidentally becomes disengaged from its pivotal hitch connection while the trailer is being towed, and

means to tighten and loosen the perimeter of said connector encompassing said curved guiding surfaces.

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**3,920,267**

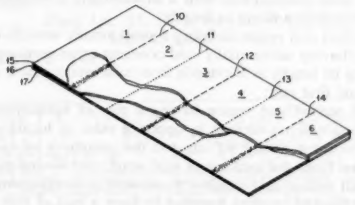
**MULTIPLE FOLDING BOOKLETS**

**Randolph S. Lyon, Jr., Westport, Conn., assignor to Kurt H. Volk, Inc., Milford, Conn.**

**Continuation of Ser. No. 125,937, March 19, 1971, abandoned. This application Feb. 28, 1973, Ser. No. 336,453**

**Int. Cl.[2] B42D** *1/00*

**U.S. Cl. 281—16** **4 Claims**



1. As an article of manufacture, a plurality of folding booklets forming a self-mailable unit consisting of

a. an elongated web of printable material comprising a plurality of layers,

b. said web being sub-divided along lines of perforations transverse of the web into a plurality of booklet panels each being of the same size,

c. each layer of each panel being detachably connected to a layer of each adjacent booklet panel along the line of perforations,

d. each booklet panel being folded at its center along a line transverse to the longitudinal axis of the web to define fields for printed matter in said panels adjacent to a centerfold line,

e. the direction of folding of each panel along its centerfold line being in a direction opposite the direction of folding of each adjacent panel,

f. each layer being permanently bound to each subadjacent layer along the centerfold line of each panel, so that upon detachment of said booklet panels from adjacent booklet panels a plurality of independent booklets is provided each having a number of pages which are permanently bound together along the centerfold line of the panels,

g. the web being folded along said centerfold lines and said lines of perforations, the direction of folding of each of said panels along said lines of perforations being in a direction opposite the direction of folding of the next adjacent line of perforations, the order of folding of the web being first along said lines of perforations to bring said centerfold lines into alignment with each other and then along said centerfold lines, to bring said panels into a securely nested relationship.

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**3,920,268**

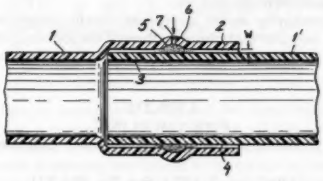
**SYNTHETIC-RESIN TUBE ASSEMBLY**

**Albert Stewing, Barbarastr 56, 427 Dorsten, Germany**

**Division of Ser. No. 332,227, Feb. 13, 1973, Pat. No. 3,847,694. This application Sept. 7, 1973, Ser. No. 395,377**

**Int. Cl.[2] F16L** *47/02*; **B29C** *27/00*

**U.S. Cl. 285—21** **1 Claim**



1. A duct for electrical conductors or the like comprising: a succession of interfitted extruded lengths of thermoplastic synthetic-resin tubes each having a unitarily formed heat-shrinkable bell portion at one end defining an internally open crescent-shaped peripheral recess and a smooth-surface opposite end received in the bell portion of an adjoining tube;

a hardened mass of heat-activatable melt adhesive filling said recess and of a heat capacity sufficient to transfer, in a heat activated liquid state of the adhesive, sufficient heat to said bell portion to shrink the latter onto said adhesive and the end of an adjoining tube received therein, said bell portion being formed with a hole communicating with said recess for the filling thereof with said adhesive, said adhesive being bonded to the respective bell portion and end of the tubes, and said bell portion being in a heat-shrunk state fitting tightly around the tube end and adhesive received therein.

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**3,920,269**

**SELF-LOCKING CONNECTOR**

**Franklin T. Anderson, Bernardsville, N.J., assignor to Co-Operative Industries, Inc., Chester, N.J.**

**Filed May 28, 1974, Ser. No. 473,432**

**Int. Cl.[2] F16L** *15/00*

**U.S. Cl. 285—84** **8 Claims**

1. A self-locking connector, comprising:

a coupling member;

said member having an axis, and being threaded along an axially-extending surface thereof for threaded engagement with a mating coupling element;

a body member;

said coupling and body members being engaged for relative rotation therebetween;

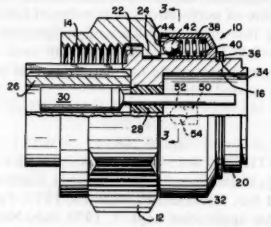
means retaining said body and coupling members in engagement; and

means interposed between said retaining means and one of said body and coupling members for resiliently restraining said body and coupling members against relative

rotation with a substantially unvariable, resilient force; wherein

said retaining means comprises an annulus;

said annulus and said body member are coaxially and slidably engaged;



said annulus has a plurality of bores axially formed therein;

said coupling member has an undulated radial surface formed thereon; and

said restraining means comprises detent means nested in said bores of said plurality thereof for lockingly engaging said undulated radial surface of said coupling member.

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**3,920,270**

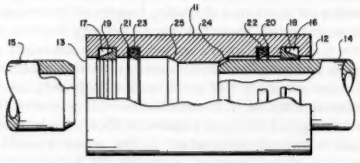
**PIPE COUPLING**

**Howard R. Babb, Jr., 36 Darbyshire Drive, Columbus, Ohio 43220**

**Filed Oct. 3, 1973, Ser. No. 403,271**

**Int. Cl.[2] F16L** *17/02*

**U.S. Cl. 285—104** **2 Claims**



1. A pipe coupling comprising:

a. a sleeve member formed with a plurality of rectangular grooves formed internally of the sleeve member at each end thereof and formed of polyvinyl chloride;

b. a sealing means positioned within one of the grooves at each end of the sleeve member;

c. means for retaining ends of cylindrical pipe, positioned within another of the rectangular annular grooves at each end of said sleeve member, which grooves are each located nearer the pipe entrance of the coupling than the grooves which house the sealing means, and the retaining means at each end comprising

an angularly transverse split ring which is internally toothed and housed so as to be limitedly movable within the associated rectangular annular groove, formed internally in the sleeve member, to embrace the outer diameter of the pipe end;

the minimum diameter of each of the split rings being less than the outer diameter of the pipe inserted;

means in each case for coacting with one of the grooves to cause the ring to alter its diameter, which causes the ring to contract when moved in one direction relative to its receiving groove and comprises a sloped exterior surface of the split ring making a line contact with the junction between the outer radial side of the associated rectangular groove with the cylindrical wall of the sleeve member to cause the ring to contract; and a radially extending annular external flange formed on the split ring adjacent to the sloping surface for coacting with said radial outer side of the associated rectangular groove to limit the longitudinal movement of the split ring.

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**3,920,271**

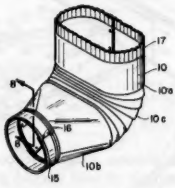
**ELBOW CONNECTOR AND METHOD OF FORMING IT**

**Leonard L. Bluestone, Beachwood, Ohio, assignor to L. B. Manufacturing Company, Cleveland, Ohio**

**Filed July 27, 1973, Ser. No. 383,153**

**Int. Cl.[2] F16L** *43/00*

**U.S. Cl. 285—176** **8 Claims**



1. A sheet metal elbow connector having a substantially constant cross-sectional area along its length, comprising:

a. a single substantially rectangular sheet of metal formed into a tubular conduit open at first and second opposite ends and having a longitudinally extending seam where side portions of said sheet are overlapped and secured together, said conduit having first and second end regions near said first and second ends and an intermediate region between said end regions;

b. said conduit being formed into an elbow by forming a series of closely spaced perimetrically extending crimps in said intermediate region to define an elbow bend having a short inner radius of curvature with said seam extending along the outer radius of curvature, said elbow bend having a generally oval cross-section with a substantially constant cross-sectional area along its length;

c. said first end region defining a substantially smooth-walled tube having substantially said constant cross-sectional area along its length as it extends from said intermediate region to said first end;

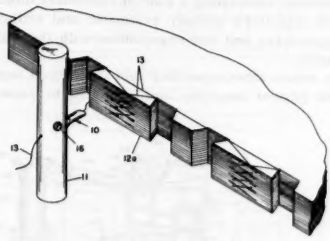
d. said second end region having a pair of substantially V-shaped notches formed in opposite sides at locations disposed substantially 90° around the periphery of said end region from the location of said seam, and having portions which define said notches positioned in overlapping relationship and secured together to form a pair of side seams which cause the perimeter of said second end region to diminish as said second end region extends away from said intermediate region while the cross-sectional area of said second end region remains substantially equal to said constant cross-sectional area as said second end region extends along its length from said intermediate region to said second end, said second end having a substantially round configuration with a cross-sectional area substantially equal to said constant cross-sectional area, whereby said second end region forms a substantially smooth-walled tubular transition between said substantially oval cross-section of said intermediate region and said substantially round configuration of said second end; and,

e. a sheet metal band secured to said second end region near said second end, said band defining a round tube which extends away from said second end region and which has a cross-sectional area substantially equal to said constant cross-sectional area to enable connection of said second end region to a round sheet metal conduit having a cross-section area substantially equal to said constant cross-sectional area.

## 3,920,272
## SEWING NEEDLE FOR CLEAT BOOKBINDING

**Henry G. Grimm, Jr., 1126 Waban Hill Road, Madison, Wis. 53711**

**Filed Dec. 20, 1974, Ser. No. 534,749**
**Int. Cl.[2] A01D** *59/04*
**U.S. Cl. 289—18** **6 Claims**

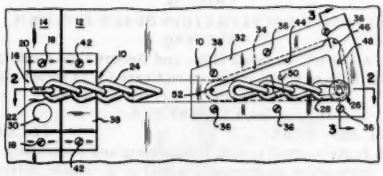


1. A sewing needle for cleat bookbinding, comprising:
a. a hollow tube having a bore large enough to allow the passage of sewing thread therethrough, the exterior of said tube having opposite convex surfaces intersecting in edges running the length of said tube; and
b. a shank having side walls and a bottom wall defining a recess therein, the side walls of said recess having substantially the shape of the exterior of said tube to allow said tube to fit closely therein and abut with said bottom wall with a substantial portion of said tube extending from said shank, said shank having a passageway therein which is in position to align with the bore of said tube when said tube is received in said recess and which is large enough to allow the passage of a sewing thread therethrough.

## 3,920,273
## KEYLESS CHAIN LOCK

**Herman J. Scholtze, 1802 Sacramento St., Berkeley, Calif. 94702**

**Filed Apr. 15, 1974, Ser. No. 461,248**
**Int. Cl.[2] E05C** *17/36*
**U.S. Cl. 292—264** **3 Claims**

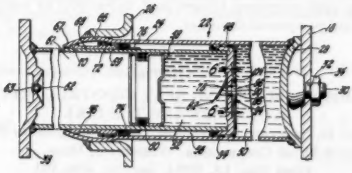


1. A chain lock comprising: an anchor member adapted to be secured to a door jamb structure; a locking plate member adapted to be secured to a door structure substantially adjacent said anchor member, said locking plate member having a longitudinal slot with a first end and a second end, and having further a first curved side slot substantially normal to the longitudinal slot intersecting said slot at the first end and a second curved side slot substantially normal to the longitudinal slot, intersecting said slot between said first end and said second end, said longitudinal slot being sloped to the horizontal with said first end above said second end, said second end being substantially adjacent said anchor member and said first end being displaced from said anchor anchor member with said curved side slots each having a radius of curvature taken from a point substantially at said second end and with said side slots depending from said longitudinal slot when said plate member is secured to said door structure; and a chain member having a first end secured to said anchor member and a second end with connecting means for engaging and tracking in said slots, said chain member being substantially taut when said connecting means engages said first side slot and when said anchor member and said plate member are secured to said structures wherein said chain member becomes increasingly taut as said connecting means tracks in said first side slot.

## 3,920,274
## TELESCOPING ENERGY ABSORBING UNIT

**Wayne V. Fannin, Xenia, Ohio, assignor to General Motors Corporation, Detroit, Mich.**

**Filed Jan. 23, 1975, Ser. No. 543,424**
**Int. Cl.[2] B60R** *19/02*; **F16F** *9/06*
**U.S. Cl. 293—70** **4 Claims**



1. An impact energy absorbing unit for mounting a bumper assembly to a support on an automotive vehicle comprising: first and second cylinders, support means mounting said first cylinder for telescopic movement with respect to said second cylinder between an extended position and a retracted position, said first and second cylinders having cooperating stop means to establish the extended position of said cylinders, said first cylinder having cap means fixed at one end thereof and slidably disposed in said second cylinder to provide variable volume first and second fluid chambers in said unit, a hydraulic fluid in said first and second chambers, an opening through said cap hydraulically communicating said first and second chambers, a fluid amplifier supported by said cap having an orifice therethrough aligned with said opening in said cap, said fluid amplifier having channel means extending at an angle with respect to said orifice to direct fluid at a predetermined angle relative to the axis of said orifice to regulate the flow through said orifice in proportion to the velocity of the inner cylinder when telescoping into said outer cylinder in response to an impact load applied to the bumper assembly whereby the energy of the impact load is dissipated.

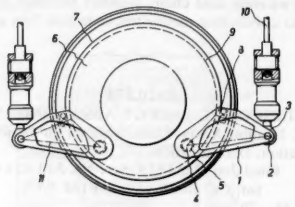
## 3,920,275
## HOISTING ARRANGEMENT ESPECIALLY FOR ROLLERS

**Dieter Junk, Kreuztal-Buschhutten; Jürgen Schlunke, and Siegfried Reich, both of Krefeld, all of Germany, assignors to Kleinewefers Industrie-Companie Gesellschaft mit beschrankter Haftung, Krefeld, Germany**

**Continuation-in-part of Ser. No. 188,310, Oct. 12, 1971, abandoned. This application July 11, 1973, Ser. No. 378,346**
**Claims priority, application Germany, Oct. 10, 1970, 7037499**[U]
**Int. Cl. B66c** *1/22*
**U.S. Cl. 294—92** **4 Claims**

1. A hoisting apparatus for a heavy roller which has an end portion having a radial end face extending to a peripheral shoulder on said end portion and which has a vertical axial plane and a horizontal axial plane, said apparatus comprising a lever having a surface for engagement with the face of said end portion, a projection at one end of said lever perpendicular to said surface and engageable in a recess in the end face of said end portion below said horizontal plane, connection means at the opposite end of said lever for connection to a hoisting device, said lever having an offset portion between

said connection means and said surface to overlie said shoulder, and an element on said offset portion spaced from said



surface and extending toward said projection to engage behind said peripheral shoulder.

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**3,920,276**

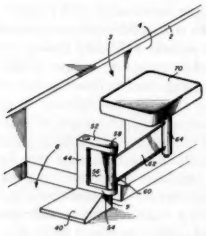
**DEMOUNTABLE SWING SEAT CONSTRUCTION FOR COUNTERS AND THE LIKE**

**Rodney G. Sparrow, Watertown, Mass., assignor to Peerless Pressed Metal Corporation, Watertown, Mass.**

**Filed Aug. 12, 1974, Ser. No. 496,391**

**Int. Cl.[2] A47B** *39/00*

**U.S. Cl. 297—142** **6 Claims**



1. A demountable swing seat construction for supporting body weight of a user in varying positions of adjustment, said swing seat construction including a pedestal base member consisting in a rectangularly shaped base plate, fastening means for securing the base plate to a supporting surface, a hollow pedestal body overlying the base plate, a tubular load sustaining column extending vertically upwardly at one side of the pedestal body and being solidly anchored to the base plate, a weight bearing bracket structure vertically disposed at an opposite side of the pedestal body in spaced relation to the tubular load sustaining column, a reinforcing web rigidly disposed between the load sustaining column and the weight bearing bracket structure, a seat supporting arm rotatably mounted in the bracket structure and a seat member adjustably located at the opposite end of the supporting arm for receiving body weight of a user.

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**3,920,277**

**TUNNEL BORING MACHINE ROLL CORRECTION**

**Douglas F. Winberg, Fall City, Wash., and Norman D. Dyer, Beaumont, Tex., assignors to Dresser Industries, Inc., Dallas, Tex.**

**Filed June 7, 1974, Ser. No. 477,367**

**Int. Cl.[2] E21D** *9/10*

**U.S. Cl. 299—31** **22 Claims**

1. A tunnel boring machine for progressively drilling a tunnel while passing therethrough and comprising:

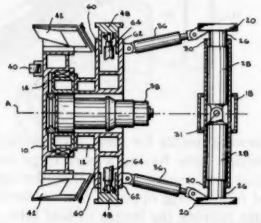
a cutterhead support;

a cutterhead rotatably mounted on a forward end of said cutterhead support for rotation about an axis generally coincident with a longitudinal centerline of said tunnel;

a frame assembly rigidly connected to said cutterhead support and extending generally rearwardly therefrom;

a gripper assembly mounted on said frame assembly rearwardly of said cutterhead support for longitudinal movement with respect to said cutterhead support, said gripper assembly comprising a pair of oppositely directed grippers selectively radially extensible and retractable for engagement and non-engagement with the wall of said tunnel;

drive means interconnecting said cutterhead support and said gripper assembly and operative to cause relative



longitudinal movement of said cutterhead support and said gripper assembly;

a bottom support assembly mounted on a lower portion of said cutterhead support, extending from said cutterhead support to the invert of said tunnel, and operative to support the weight of said cutterhead support and said cutterhead on the invert of said tunnel during each operational mode of said tunnel boring machine including a drilling mode in which said grippers are engaged with the wall of said tunnel and said cutterhead support is driven longitudinally with respect to said gripper assembly by said drive means; and

roll correction means carried by said cutterhead support and operative to rotate said cutterhead support generally about the axis of said cutterhead.

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**3,920,278**

**SELECTIVE DECELERATION BRAKE CONTROL SYSTEM**

**Edgar A. Hirzel, Granada Hills, and Robert Dale Cook, Newhall, both of Calif., assignors to Crane Co., Chicago, Ill.**

**Filed Aug. 30, 1973, Ser. No. 393,069**

**Int. Cl.[2] B60T** *8/08*

**U.S. Cl. 303—21 BE** **12 Claims**

1. A brake control system for applying and controlling the brake application means for a wheel of a vehicle independently of operator brake application comprising:

signal generating means for producing a wheel speed signal that is a function of the rotational speed of said wheel;

means compelled agreement differentiator for converting said signal into a deceleration signal which is a function of the rate of deceleration of said wheel;

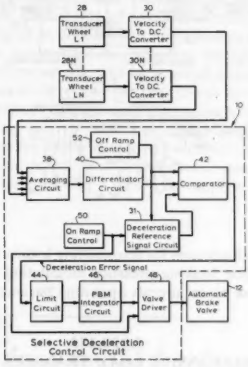
reference generating means for generating a preselected instant magnitude reference deceleration signal;

rate selector means for manually selecting a preselected reference deceleration signal indicative of a desired rate of vehicle deceleration;

comparison means for comparing said deceleration signal with said reference deceleration signal for generating a deceleration error signal indicative of the difference between said deceleration signal and said reference deceleration signal; and

control means for providing a signal to said brake application means to apply brake pressure to said wheel indepen-

dently of operator brake application and responsive to said deceleration error signal to provide brake control signal for controlling said brake pressure in order to maintain said desired rate of deceleration.

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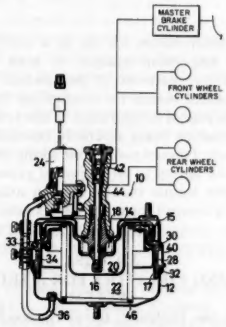
**3,920,279**

## ANTI-SKID BRAKE CONTROL ASSEMBLY OF THE DIAPHRAGM TYPE

**Masami Inada, Toyoake, and Masamoto Ando, Toyohashi, both of Japan, assignors to Aisin Seiki Kabushiki Kaisha, Aichi, Japan**

**Filed May 24, 1974, Ser. No. 473,082**
**Claims priority, application Japan, May 24, 1973, 48-06137**
**Int. Cl.[2] B60T** *8/02*; **F16J** *3/02*
**U.S. Cl. 303—21 F** **4 Claims**




**1.** In an anti-skid brake control assembly for vehicles including a casing, two diaphragm members provided in said casing and defining three chambers within the interior of said casing, the first chamber of said three chambers constituted by said casing and one of said diaphragm members being selectively supplied with atmospheric air or vacuum, the second chamber thereof constituted by said two diaphragm members being normally supplied with atmospheric air, and the third chamber thereof constituted by said casing and the other of said diaphragm members, a cut-off valve operatively connected with said two diaphragm members thereby controlling the fluid communication between the master brake cylinder means and wheel brake cylinder means, the improvement comprising an annular member fixed to said casing at said interior thereof, an outer edge of said other diaphragm member being provided with a flange, said flange being engageable with said annular member whereby the movement of said other diaphragm member is limited and guided.

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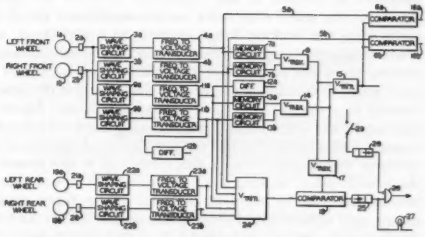
**3,920,280**

## ANTISKID BRAKE CONTROL SYSTEM HAVING MALFUNCTION PROTECTION

**Dieter Lühdorff, Hannover; Lutz Weise, Misburg; Erich Reinecke, Beinhorn, and Alfred Klatt, Ronnenberg, all of Germany, assignors to WABCO Westinghouse GmbH, Hannover, Germany**

**Filed May 23, 1974, Ser. No. 472,609**
**Claims priority, application Germany, Aug. 10, 1973, 2340575**
**Int. Cl.[2] B60T** *8/10*
**U.S. Cl. 303—21 AF** **9 Claims**




**1.** A vehicle antiskid brake control system comprising:

a. first means for providing wheel velocity signals according to the speeds of rotation of the individual wheels of the vehicle;

b. means for forming a reference velocity signal from a wheel velocity signal of at least one wheel of the vehicle as an approximation of the vehicle speed;

c. means for comparing said wheel velocity signals of the individual wheels with said reference velocity signal to obtain a wheel skid control signal when differences therebetween occur so as to effect modulation of brake pressure at whichever wheel is providing said wheel velocity signal different than said reference velocity signal; wherein the improvement comprises:

d. second means in parallel with said first means for providing additional wheel velocity signals according to the speeds of rotation of the individual wheels of the vehicle in addition to said first mentioned wheel velocity signals thereof and

e. said means for forming a reference velocity signal including third means for selecting the lower one of said additional and said first mentioned velocity signals of said at least two wheels for use in forming said reference velocity signal.

**3,920,281**

## SERVO-STABILIZING ARRANGEMENT FOR THE SPEEDS OF VEHICLE WHEELS WITH DELIBERATE BRAKING

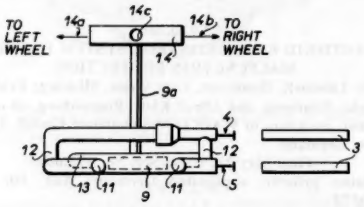
**Marcel Brun, 7 Boulevard Karl Marx, 42100 Saint-Etienne-Loire, France**

**Filed May 24, 1974, Ser. No. 473,321**

**Claims priority, application France, May 28, 1973, 73.19941**

**Int. Cl.[2] B60T** *8/24*

**U.S. Cl. 303—21 R** **11 Claims**




1. Apparatus for servo-stabilizing the speeds of two wheels of a vehicle during braking thereof, said apparatus comprising speed responsive means coupled to each of two wheels to be braked for producing an output signal related to the speed of the associated wheel, a receiver member coupled to said speed responsive means and including a control element which is operative in relation to any difference between the output signals of the speed responsive means, distributor means for controlling the braking force exerted on each wheel, said control element being coupled with said distributor means to control the same to establish the braking forces exerted on each wheel to equalize the speeds of the wheels at the time of braking in a straight line, means responsive to the degree of steering of the wheels and acting on said control element to counteract inequality of the output signals of the speed responsive means and provide differentiation in the speeds of the wheels when braking on a curve, vehicle speed sensing means actuated by ambient air, and brake force sensing means, said vehicle speed sensing means and said brake force sensing means being connected to said distributor means for decreasing braking action when the speed of the vehicle is above a pre-determined value and the braking force exceeds a pre-determined value.

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**3,920,282**

## AIRCRAFT AUTOMATIC BRAKING SYSTEM

**Garrett H. DeVlieg, Bellevue, Wash., assignor to The Boeing Company, Seattle, Wash.**

**Division of Ser. No. 394,890, Sept. 6, 1973. This application June 7, 1974, Ser. No. 477,244**

**Int. Cl.[2] B60T** *8/02*

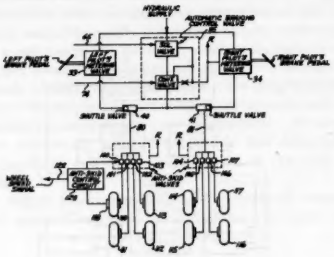
**U.S. Cl. 303—21 F** **6 Claims**

1. An aircraft automatic braking system comprising in combination:

means for generating a brake pressure control signal;

automatic braking pressure modulating valve means responsive to said brake pressure control signal for metering automatic braking pressure to first shuttle valve means for application to the brakes on one side of the aircraft and second shuttle valve means for application to the brakes on the other side of the aircraft;

first manually controlled pressure metering valve means coupled to said first shuttle valve means and second manually controlled pressure metering valve means coupled to said second shuttle valve means, each of said first and second shuttle valve means arranged for transmitting the greater of manually or automatically controlled pressures for application to the brakes on the respective sides of the aircraft; and



shutoff valve means for transmitting hydraulic power to said automatic braking pressure modulating valve means in response to an aircraft operating parameter.

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**3,920,283**

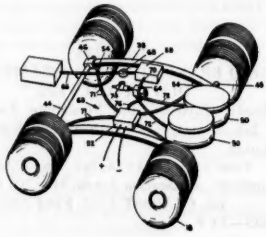
## BRAKE RESPONSIVE LOAD TRANSFER APPARATUS AND METHOD

**Don S. Strader, Muskegon, Mich., assignor to Lear Siegler, Inc., Santa Monica, Calif.**

**Filed Aug. 26, 1974, Ser. No. 500,636**

**Int. Cl.[2] B60T** *8/22*

**U.S. Cl. 303—21 A** **32 Claims**



1. Load transfer means for use in a vehicle comprising a tandem axle suspension system; at least one air spring mounted over the rearmost of the tandem axles; and anti-wheel lock control means for controlling brake pressure in response to the rate of deceleration of the vehicle wheels, said load transfer means being operably connected to the anti-wheel lock control means and the air spring and being adapted to inflate the air spring to an increased pressure to resist the effects of brake torque on the tandem axles whenever the anti-wheel lock control means becomes actuated.

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**3,920,284**

## MONITORING CIRCUITRY FOR A SKID CONTROL SYSTEM

**Eneas James Lane, Highland; David Thomas Klien, and Steven Geppert, both of Southfield, all of Mich., assignors to Eaton Corporation, Cleveland, Ohio**

**Filed May 10, 1974, Ser. No. 468,929**

**Int. Cl.[2] B60T** *8/00*

**U.S. Cl. 303—21 AF** **12 Claims**

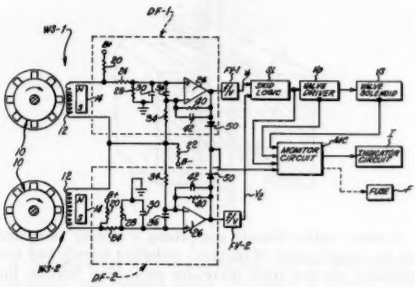
1. A skid control system for use with a vehicle having at least first and second spaced apart independently rotatable wheels and a braking system for applying braking forces to said wheels and comprising:

brake control means responsive to a skid signal for controlling said braking system to release the braking forces on said wheels;

means for providing first and second wheel speed signals respectively representative of the wheel speeds of said first and second wheels;

logic circuit means for utilizing said first and second wheel speed signals to determine therefrom an incipient skid condition of at least one of said wheels and providing a said skid signal in dependence upon said determination; said brake control means including energizable valve solenoid coil means for, when energized, acting upon said braking system to release braking forces on said wheels and valve driver circuit means responsive to a skid signal for energizing said valve solenoid coil means; and

monitor means for disabling said valve driver circuit means in response to detection of an erroneous operating characteristic and comprising means for applying a DC test current of a magnitude insufficient to energize said valve solenoid coil means to flow through said coil means to develop a test voltage thereacross, first test circuit means for diverting said test current to flow in a first signal path when said valve solenoid coil means develops an open circuit fault, second test circuit means for producing a signal current in a second signal path when a short circuit of said valve solenoid coil means reduces said test voltage below a predetermined threshold, means including a third current path for combining said first and second signal current paths so that either an open circuit or short circuit fault produces a fault signal current in said third current path, and circuit means for disabling said valve driver circuit means in dependence upon said fault signal current in said third path.

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**3,920,285**

**RAIL TRAIN VEHICLE BRAKE CONTROL APPARATUS UTILIZING COMMON ANALOG CONTROL AND A.C. SUPPLY SIGNALS**

**Arthur Maskery, London, England, assignor to Westinghouse Brake & Signal Co., Ltd., London, England**

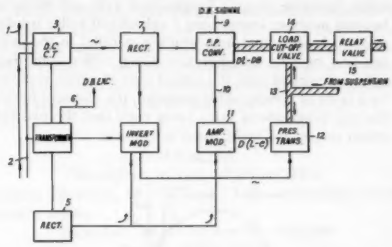
**Filed Feb. 14, 1974, Ser. No. 442,690**

**Claims priority, application United Kingdom, Feb. 27, 1973, 09631/73**

**Int. Cl.[2] B60T** *8/18*

**U.S. Cl. 303—22 R** **6 Claims**

**1.** Rail train vehicle apparatus including a control signal input for receiving, in common with other vehicles of a train, an analog control signal input representing a desired degree of braking, an a.c. supply input for receiving, in common with other vehicles of the train, an a.c. supply current, and electrically operating braking control signal processing apparatus which is connected to said control signal input and said a.c. supply input and further receives an input representative of dynamic braking and which, in operation, is powered, apart from the control signal, only by the power derived from the




a.c. supply current, for producing a brake control signal output for an electro-pneumatic brake.

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**3,920,286**

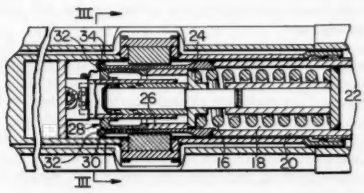
**IDLER RECOIL AND TRACK ADJUSTER SPRING RETENTION ARRANGEMENT, AND METHOD OF ASSEMBLY AND DISASSEMBLY THEREOF**

**Francis D. Bell, Peoria, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.**

**Filed Jan. 30, 1975, Ser. No. 545,447**

**Int. Cl.[2] B62D** *55/30*

**U.S. Cl. 305—10** **7 Claims**




**1.** A spring retention arrangement comprising:

a casing within which the spring is positioned, and having a wall portion against which one end of the spring is positionable;

a threaded member adapted for threaded engagement with the casing adjacent an end thereof, and movable upon rotation thereof relative to the casing toward and away from the wall portion to first and second positions, relatively further from and nearer to the wall portion respectively, with the threaded member being in threaded engagement with the casing in said first and second positions; and

means associated with the threaded member for providing that, with the threaded member in its second position, the spring is in a compressed state, and with the threaded member in its first position the spring is fully extended to its free length.

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**3,920,287**

**SEAL**

**Guillaume Ward Jamin, Manchester, England, assignor to Imperial Chemical Industries Limited, London, England**

**Filed June 3, 1974, Ser. No. 475,913**

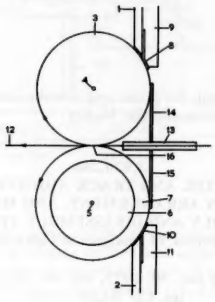
**Claims priority, application United Kingdom, July 16, 1973, 33717/73**

**Int. Cl.[2] F16C** *33/72*

**U.S. Cl. 308—3.5** **5 Claims**

**1.** Sealing apparatus for permitting continuous passage of a web material through a gap in a wall separating two zones at different pressures while minimizing the flow of air from one zone to the other, comprising

a. first and second bearing members between which the web material passes, said bearing members being built into the gap, the first bearing member comprising a cylindrical roller rotatable about a longitudinal axle and the second bearing member comprising a cylindrical roller rotatable about a longitudinal axle which is parallel to the axle of the first bearing member and which roller comprises a solid cylindrical core the lateral face of which is covered by a layer of compressible material, the distance between the two longitudinal axles being such that the two cylindrical rollers are maintained in contact,



b. first sealing means provided between the lateral faces of both bearing members and edges of the gap adjacent thereto, and

c. second sealing means provided between the end faces of both bearing members and edges of the gap adjacent thereto, said second sealing means comprising a plate disposed on each side of said bearing members between the end faces of said bearing members and the gap edges adjacent thereto, and a plurality of springs for biasing each plate into contact with the corresponding end faces of said bearing members throughout the length of said end faces.

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**3,920,288**

**COVER DEVICE FOR SLIDE WAY**

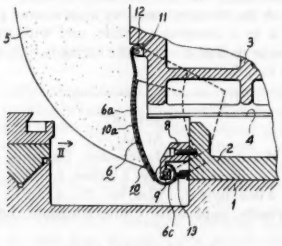
**Teruyuki Ito, Kariya, Japan, assignor to Toyoda Koki Kabushiki-Kaisha, Aichi, Japan**

**Filed Aug. 19, 1974, Ser. No. 498,411**

**Claims priority, application Japan, Aug. 29, 1973, 48-102032**

**Int. Cl.² F16C** *17/00*

**U.S. Cl. 308—3.5** **5 Claims**



1. A cover device for covering slide ways formed on a stationary base and a slide, comprising:

a first cover member rotatably mounted on said stationary base, said first cover member comprising a first front plate for covering the front of said slide ways and first side plates extending perpendicularly to said first front plate for covering the sides of said slide ways, and

a second cover member rotatably mounted on said slide, said second cover member comprising a second front plate for covering the front of said slide ways, second side plates extending perpendicularly to said second front plate for covering the sides of said slide ways and guide recesses formed on said second side plates for slidably receiving said first side plates.

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**3,920,289**

**LINEAR ROLLER BEARING**

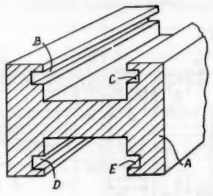
**Gerard Demay, Villa Helene, 8 Rte. de Lescar, 64000 Lons-Pau, France**

**Filed Apr. 30, 1974, Ser. No. 465,491**

**Claims priority, application France, May 2, 1973, 73.15635**

**Int. Cl.² F16C** *29/04*

**U.S. Cl. 308—6 C** **17 Claims**



1. A linear roller bearing comprising a unitary elongated block of a single piece of material including a body and two longitudinal flanges rigid therewith projecting beyond the longitudinal outline of the body throughout its extent, an endless groove formed in each flange extending in a longitudinal plane along two longitudinal lines interconnected by curved lines on the outside of said body outline, the grooves in said flanges being arranged symmetrically and facing each other, a series of rollers extending transversely of the body, the opposite ends of the rollers being substantially flat and guided against the inner faces of the flanges, and means engaging the rollers and the walls of the grooves in the flanges for holding the rollers in place as they traverse the path defined by the grooves.

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**3,920,290**

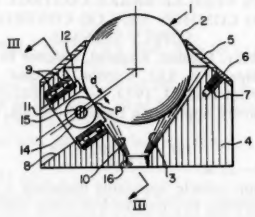
**BALL TRANSFER UNIT**

**Kingsley S. Evarts, Pittsburgh, Pa., assignor to J & M Hydraulic Servic, Inc., Pittsburgh, Pa.**

**Filed Feb. 11, 1974, Ser. No. 441,458**

**Int. Cl.² F16C** *21/00*

**U.S. Cl. 308—6 R** **9 Claims**



1. A ball transfer unit comprising:

A. a ball;

B. a housing;

C. means for rotatably supporting the ball within the housing with substantially no sliding friction between the

supporting means and the ball in any direction of rotation and in any orientation of the unit; and

D. means for retaining the ball on the supporting means and within the housing.

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**3,920,291**

## RESILIENTLY JOURNALED SPINDLE

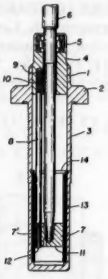
**Gunther Wendel, and Heinz Meissler, both of Stuttgart, Germany, assignors to SKF Kugellagerfabriken, Schweinfurt, Germany**

**Filed June 12, 1973, Ser. No. 369,223**

**Claims priority, application Germany, June 15, 1972, 2229111; May 11, 1973, 2323850**

**Int. Cl.² F16C** *19/10, 35/08, 35/12, 41/00*

**U.S. Cl. 308—152** **22 Claims**



1. An assembly for journalling the shaft of a the spindle of a spinning and twisting frame comprising a bearing housing having a neck bearing at the upper end and a foot bearing at the lower end, each of said neck and foot bearing being mounted in a bearing mount located within said housing, at least one of said neck and foot bearing mounts being axially movable with respect to said housing and at least one elongated tension spring fixedly connected at its respective ends to said neck and foot bearing mounts so as to yieldably space said neck and foot bearings from each other.

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**3,920,292**

## COMBINED AXIAL-RADIAL BEARINGS

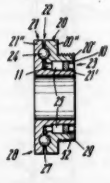
**Berthold Haussels, Wermelskirchen, Germany, assignor to Firma Acousa Saxon S.A., Saxon, Switzerland**

**Filed Dec. 5, 1973, Ser. No. 422,106**

**Claims priority, application Germany, Dec. 8, 1972, 2260108; Mar. 14, 1973, 2312570**

**Int. Cl.² F16D** *43/14*

**U.S. Cl. 308—174** **19 Claims**



1. A combined axial-radial for components which are rotatable relative to one another, said bearing comprising a first bearing ring having a radial flange and an axial flange and connectable to one of said components, a second bearing ring having a radial flange confronting said radial flange of said first bearing ring and an axial flange surrounding the axial flange of said first bearing ring, said second bearing ring being connectable with another of said components, radial bearing means comprising a plurality of rolling elements received in a circular array between said radial flanges, said radial flanges being provided with confronting grooves forming races for said rolling elements, and axial bearing means between said axial flanges and including an array of rolling elements, said axial flanges being formed with mutually confronting recesses forming races for the rolling elements of said axial bearing means, said radial bearing means providing axial retention of the two bearing rings one on the other.

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**3,920,293**

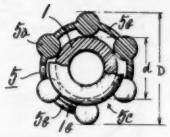
## BEARING MADE OF PLASTICS

**Hirokazu Takeuchi, 15, 1-Chome, Toyosakinishidori, Oyodo, Osaka, Japan**

**Filed Apr. 30, 1974, Ser. No. 465,669**

**Int. Cl.² F16C** *33/20*

**U.S. Cl. 308—191** **7 Claims**



1. A bearing comprising an inner ring adapted to be mounted on a shaft, an annular outer ring surrounding said inner ring concentrically therewith, said rings having opposed parallel surfaces spaced from each other, a plastic annular intermediate element idly rotatably accommodated between said annular surfaces and slidingly rotatable to follow the rotation of one of said rings, and a retainer ring fitted in one open side of the outer ring to retain the annular intermediate element in position, the annular intermediate element having a plurality of members of circular section equidistantly spaced and connector plates integrally formed with said members and interconnecting the members, said members and connector plates being bent in the shape of a ring with a gap between the end members in the plurality of members.

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**3,920,294**

## DISPENSER FOR TEXTILE HAND TOWELLING WEB

**Gunter Kullik, Beerfelden, Falken-Gesass, Germany, assignor to Conrad Wolfgang Schnyder, Triesenberg, Liechtenstein**

**Filed Jan. 31, 1975, Ser. No. 545,784**

**Claims priority, application Switzerland, Feb. 6, 1974, 1605/74**

**Int. Cl.² B65H** *19/00*

**U.S. Cl. 312—38** **2 Claims**

1. A dispenser for textile hand towelling web comprising:

a housing adapted to accommodate a supply of fresh hand towelling,

a dispensing roller and means for driving said dispensing roller in order to withdraw hand towelling from said supply and to dispense this hand towelling from said housing,

a retracting device and means for driving said retracting device in order to draw used hand towelling into said housing, said retracting device also being operable in a reverse direction to dispense used hand towelling from said housing,

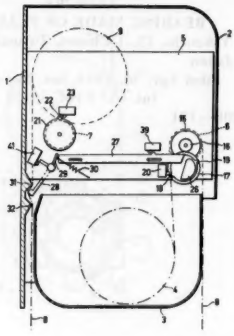
a towelling braking flap arranged to bear yieldably against said hand towelling running to said retracting device, to divert this hand towelling so as to smooth and tension it, an adjusting member which is operable to move said hand towelling braking flap out of the way of the hand towelling into an ineffective position for the dispensing of used hand towelling.

a dog coupled to said dispensing roller for operating said adjusting member,

and a programming control arrangement including:

a. means for holding said dispensing roller driving means in an active condition in a first programme stage for the purpose of dispensing a first part length of fresh hand towelling and moving said towelling braking flap into its ineffective position,

b. means for operating said retracting device in said reverse direction in a second programme stage for the purpose of dispensing a length of used hand towelling,



c. means for maintaining said dispensing roller driving means switched in again in a third programme stage for the purpose of dispensing a second part length of fresh hand towelling and releasing said towelling braking flap,

d. means for holding said dispensing roller driving means and said retracting device driving means out of action for a predetermined time period in a fourth programme stage, and

e. means for driving said retracting device in at least one final programme stage for drawing in the used hand towelling.

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**3,920,295**

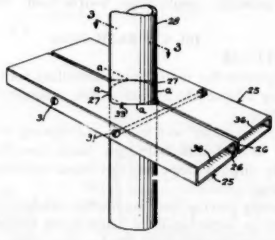
**COLUMN MOUNTED TOOL HOLDER**

**Leonard A. Speckin, 308 Academy, Portland, Mich. 48875**

**Filed Dec. 20, 1973, Ser. No. 426,545**

**Int. Cl.[2] A47B** *87/00*

**U.S. Cl. 312—108** **6 Claims**



**1.** A column mounted tool holder including in combination two structural members of hollow construction, each having top and side walls, each of said members having one of said side walls complementary in shape to one side wall of the other of said structural members, said structural members being adapted, when placed in contiguity with said complementary shaped walls in substantial alignment, to form a substantially flat and continuous work surface from the top surfaces of said structural members, a load bearing V-groove provided in said complementary shaped walls of each of said structural members and being adapted to engage a support column when such structural members are assembled, and integral fastening means to hold such structural members in contiguity and adapted to place pressure on said support column by means of said V-grooves, thereby supporting said tool holder on said support column without any other supporting means, and with no modification to said support column, wherein said structural members are constructed of rigid tubing having a rectangular cross section, and are provided with a generally rectangular drawer in at least one end of one said structural members to provide storage space for small parts.

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**3,920,296**

**JOURNAL BEARING**

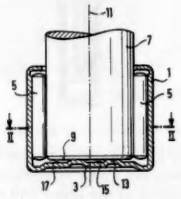
**Hellmuth Eckhardt, Herzogenrath, Germany, assignor to Torrington GmbH, Wurselen, Germany**

**Filed Mar. 11, 1974, Ser. No. 449,961**

**Claims priority, application Germany, Mar. 17, 1973, 7310156**

**Int. Cl.[2] F16C** *13/00*

**U.S. Cl. 308—212** **5 Claims**



**1.** A bearing for receiving a journal comprising: a bearing cup having a closed bottom for the end of the journal to abut against, and a projection formed in the closed bottom eccentrically relative to the axis of the bearing.

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**3,920,297**

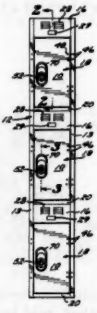
**LOCKER UNITS**

**Arthur H. Brandes, Seal Beach, Calif., assignor to Brandes Enterprises, Inc., Monrovia, Calif.**

**Filed Oct. 11, 1974, Ser. No. 514,266**

**Int. Cl.[2] E05B** *65/46*

**U.S. Cl. 312—217** **10 Claims**



**1.** A locker unit defining an enclosure having a top, bottom and spaced apart sides and comprising:

a pair of horizontally spaced apart upright side members defining the side edges of a door opening to said enclo-

sure, said side edges being generally aligned with the sides of said enclosure;

a lower cross member extending between and attached to said side members and defining the lower edge of said door opening, said lower cross member being generally aligned with the bottom of said enclosure;

an upper panel extending between and attached to said side members and having a lower edge portion defining the upper edge of said door opening and an upper edge portion generally aligned with the top of said enclosure; and

a door located in said door opening and hinged to one of said side members, said upper panel being approximately four times greater in height relative to said cross member thereby to reduce the door height relative to the height of said enclosure whereby the resistance of said door to bending deformation is increased compared to a door approximately equal to said height of said enclosure.

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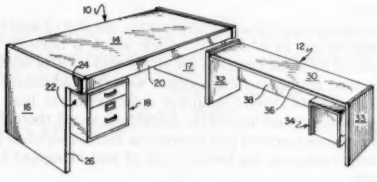
**3,920,298**

**CONVERTIBLE DESK AND SECRETARIAL RETURN**

**Jose Lopez, Miami, Fla., assignor to Camilo Muebles, Inc., Coral Gables, Fla.**

**Filed July 5, 1974, Ser. No. 486,173**
**Int. Cl.[2] A47B** *47/00*
**U.S. Cl. 312—195** **8 Claims**



1. A combination desk and secretarial return which may be easily converted between a left-hand and a right-hand desk and secretarial combination, comprising:

a substantially planar desk top member;

first support means for supporting said desk top member;

a first pedestal unit;

first means for slidably mounting said first pedastal unit to said desk top member in a position below the top surface of said top member so that said first pedestal unit is movable along the longitudinal axis of said desk top member from one end to the other end thereof;

a substantially planar secretarial return top portion situated perpendicularly to said desk top member at one end of said desk top member;

second support means for supporting said secretarial return top portion;

a second pedestal unit; and

second means for slidably mounting said second pedestal unit to said secretarial return top portion in a position below the top surface of said top portion so that said second pedestal unit is movable along the longitudinal axis of said secretarial return top portion from one end to the other end thereof,

said first and second pedestal units being situated at the ends of said desk top member and said secretarial return top portion which are remote from the ends thereof at which said secretarial return top portion and said desk top member are perpendicularly situated,

said first means including a first guide assembly extending along said desk top member in a direction parallel to the longitudinal axis of said desk, and a first guide follower coupled to said first pedestal unit and receivable in and movable along said first guide assembly,

said second means including a second guide assembly extending along said secretarial return top portion in a direction parallel to the longitudinal axis of said secretarial return top portion, and a second guide follower coupled to said second pedestal unit and receivable in and movable along said second guide assembly.

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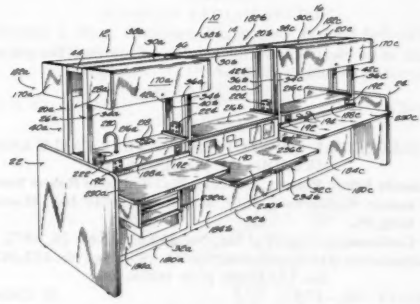
**3,920,299**

**LABORATORY MODULE SYSTEM**

**Robert L. Propst, Ann Arbor, and James O. Kelley, Spring Lake, both of Mich., assignors to Herman Miller, Inc., Zeeland, Mich.**

**Filed Aug. 5, 1974, Ser. No. 494,455**
**Int. Cl.[2] A47B** *77/00*
**U.S. Cl. 312—223** **15 Claims**



1. A laboratory module system having fluid and electrical accessories and outlets incorporated therewith comprising, in combination: a free standing central frame comprised of at least one pair of first and second rectangular sub-frames interconnected to each other in spaced relationship, each of said sub-frames having horizontal top and bottom tube-like members connected to vertical end tube-like members, one or more of said vertical members including latch means extending vertically the length thereof, said central frame having a lower enclosed portion and an upper exposed portion, said lower enclosed portion having vertical panel means and a horizontal shelf at the transition of said upper and lower portions, said shelf extending between said sub-frames, the fluid and electrical accessories and outlets being enclosed within said lower portion and having outlet means through at least one of said panel means or shelf, said vertical panel means having portions thereof detachable from said central frame permitting access to the interior of said lower portion of said central frame, and at least one laboratory components detachably latched to said latch means.

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**3,920,300**

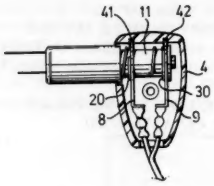
**ELECTRIC CONNECTOR**

**James E. Kenny, 28 Wolvengracht, Brussels, Belgium**

**Filed Oct. 4, 1974, Ser. No. 512,297**
**Claims priority, application Belgium, July 4, 1974, 146243**
**Int. Cl.[2] H01R** *39/00*
**U.S. Cl. 339—8 R** **2 Claims**

1. An electric connector for electric apparatus, comprising an elongated body made of insulating material, presenting at one end a cylindrical terminal portion and at the opposite end a cavity capable to be fitted on a supporting member interlocked with the electric apparatus, several electroconductor wires provided in the said body parallel to the longitudinal direction and emerging at the extremity thereof where the cavity is formed, the other wire extremities emerging from said body at distinct points separated from one another along the longitudinal direction of the body and coiled around the said cylindrical terminal portion of the body, and several metal contact shoes mounted on the said cylindrical terminal portion transversely to the longitudinal direction of the body

in such a way as to rotate freely around the said cylindrical portion, each shoe being in electric contact with the terminal




turn of an electroconductor wire, and each shoe being connected to an outer conductor.

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**3,920,301**

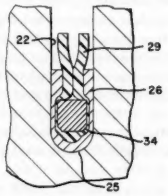
## ELECTRICAL CONNECTORS FOR FLAT CABLE AND METHODS OF MAKING SAME

**Lincoln Edwin Roberts, Dunedin, Fla., and John Robert Shoemaker, Walkertown, N.C., assignors to AMP Inc., Harrisburg, Pa.**

**Continuation-in-part of Ser. No. 310,056, Nov. 28, 1972, abandoned. This application Nov. 30, 1973, Ser. No. 413,092**

**Int. Cl.[2] H01R** *9/08;* **H05K** *1/02*

**U.S. Cl. 339—17 F** **21 Claims**




**18.** An electrical device such as a multi-contact electrical connector, said device comprising an insulating housing having electrical contact terminals therein, each of said terminals having a plate-like portion having a free end, each of said plate-like portions having a conductor receiving slot extending therein from said free end, said plate-like portions being in spaced-apart side-by-side co-planar relationship to each other, and a flat cable in combination with said electrical device, said cable comprising a plurality of flat, ribbon-like spaced-apart, parallel conductors which are contained in a continuous web of insulating material and the improvement comprising:

a plurality of punched openings in said web, said openings being between adjacent conductors in said cable and being in alignment in the direction of the width of said cable,

portions of said conductors which are between said openings being disposed in said slots of said plate-like members,

a wedge member in each of said slots, each of said wedge members urging said portions of said conductors against edge portions of said slots thereby to establish electrical contact between said conductors and said plate-like members,

each of said plate-like members extending through two adjacent openings in straddling relationship to one of said conductors, and

the ends of said openings being adjacent to said plate-like members.

**3,920,302**

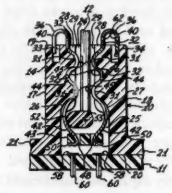
## ZERO INSERTION FORCE SOLDERLESS CONNECTOR

**Johh M. Cutchaw, 7333 E. Virginia, Scottsdale, Ariz. 85257**

**Filed May 2, 1974, Ser. No. 466,150**

**Int. Cl.[2] H01R** *13/54*

**U.S. Cl. 339—75 MP** **12 Claims**



**1.** A connector for electrically interconnecting a first and a second electric structures comprising:

a. an elongated body having a top wall and a bottom wall with a slot communicating therebetween, said body adapted for mounting on a surface of the first electric structure with the bottom wall substantially flush therewith, the slot in said body adapted to receive an edge of the second electric structure centrally therein, at least one of the side walls of the slot in said body being undulatory;

b. at least one conductive strip within the slot of said body and having an undulatory shank which is normally displaced from the center of the slot of said body in nestingly aligned contiguous engagement with the undulatory side wall thereof, said conductive strip having at least one pressure contact area of the undulatory shank thereof and a pressure terminal pad on the end thereof which is positioned adjacent the bottom wall of said elongated body; and

c. means within said body and coupled to said conductive strip for movement thereof toward the bottom wall of said body for moving the pressure terminal pad of said conductive strip into conductive pressure contact with the surface of the first electric structure mounted substantially flush therewith, and for simultaneously moving said conductive strip relative to the undulatory side wall of the slot of said body for moving the undulatory shank of said conductive strip out of its normal contiguous engagement with the undulatory side wall of the slot of said body toward the center of that slot for moving the pressure contact area of said conductive strip into conductive pressure contact with the edge of the second electric structure inserted therein.

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**3,920,303**

## LOW FORCE INSERTION CONNECTOR

**Robert D. Pittman, River Edge, N.J., and Michael Offerman, Long Beach, N.Y., assignors to Industrial Electronic Hardware Corporation, New York, N.Y.**

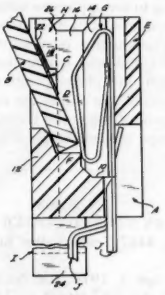
**Continuation of Ser. No. 390,090, Aug. 23, 1973, abandoned. This application Dec. 4, 1974, Ser. No. 529,332**

**Int. Cl.[2] H01R** *13/54*

**U.S. Cl. 339—91 R** **16 Claims**

**16.** A low force insertion connector for use with a circuit board having a terminal on the surface thereof, said connector having a contact mounted thereon and being of the type in which the board is inserted into said connector in a first position wherein there is at most minimal engagement between said terminal and said contact and is movable to a second position wherein operative engagement between said terminal and said contact is achieved, said connector comprising a housing having a recess therein, said recess being defined, in part, by a back wall, a bottom wall, and a front wall, said contact being situtated in said recess adjacent said back wall, and an abutment within said recess integral with said bottom

wall, said abutment and another portion of said housing joining to form a point about which said board pivots as said board moves from the first to the second position, said pivot point being spaced from said contact along said abutment so as to



form an unobstructed opening between said pivot point and said contact into which the board may be inserted, the pivot point engaging the board on the opposite side thereof from the contact-engaging side thereof.

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**3,920,304**

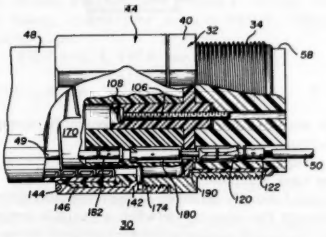
**CONVERSION KIT FOR LIQUID TIGHT CONNECTOR**

**Menashe Bromberg, West Orange, N.J., assignor to Thomas & Betts Corporation, Elizabeth, N.J.**

**Filed Jan. 6, 1975, Ser. No. 538,806**

**Int. Cl.[2] H01R** *7/02*

**U.S. Cl. 339—94 M** **9 Claims**



**1.** A conversion kit for converting to a multi-pin disconnect a liquid tight connector of the type employed with plastic sheathed, flexible, metallic conduit and having a body member having a first threaded portion for insertion within the knockout of an electrical enclosure, a second threaded portion for receipt thereon in threaded engagement a gland, said body member having a bore therethrough and a bushing in said bore within said first portion, and a gland having a bore therethrough, a first end portion of said gland having internal threading to threadably engage said second threaded portion of said body member and a sealing ring in said bore of said gland at a second end portion of said gland, said kit comprising: a first insert body having first and second faces and a plurality of bores extending between said first and said second faces; a flange insert having a central hub and a circular skirt thereabout; a plurality of bores in said circular skirt equal in number and similar in location to the bores in said first insert body; fastening means for fastening said first insert body to said flange insert in said body member with said bores in said flange insert in alignment with said bores in said first insert body; a first plurality of pins, one for each bore in said flange insert, inserted in said aligned bores in said first insert body and said flange insert; a second insert body having third and fourth faces and a plurality of bores extending between said third and fourth faces; a grounding cone having an outwardly extending thread at a first end for engaging the voids between the convolutions of a metallic conduit inserted within said sealing ring within said gland, said grounding cone having an inturned second end engaging said second insert body to retain said second insert body within said ground cone; a second plurality of pins, one for each bore in said second insert body, each of said second plurality of pins being inserted within a corresponding bore in said second insert body, said first plurality and second plurality of pins engaging when said gland is threadably engaged with said second threaded portion of said body member.

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**3,920,305**

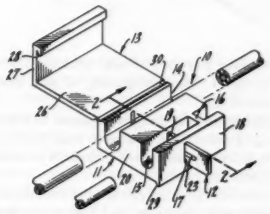
**NO-STRIP TAP CONNECTOR**

**William J. Scott, Sycamore, Ill., assignor to Ideal Industries, Inc., Sycamore, Ill.**

**Filed Jan. 21, 1974, Ser. No. 435,108**

**Int. Cl. H01r** *13/38*

**U.S. Cl. 339—98** **7 Claims**



**1.** A no-strip tap connector comprising a solid body of insulating material with two longitudinal wire-receiving channels at least one of which extends through the entire length of the body and opens continuously along the top surface of the body to accept a continuous wire, the other channel being for a tap wire and also opening directly along the top surface of the body and containing a generally traverse stop surface, a transverse slot extending across the channels intermediate the length of the tap wire channel and opening through a longitudinal side of the body normal to the top surface, a conductive insert insertable into the transverse slot through said body side and having an end slot at one end to penetrate the insulation of a continuous wire in the continuous wire channel, an insulation piercing slot adjacent the other end of the insert and generally aligned with the end slot for penetrating the insulation of a tap wire in the tap wire channel, a cover flap integral with and hinged to the body and of a size to cover the top and side so as to close and cover the open channels and side slot, and means for locking the cover flap in a closed position over the top and side of the body.

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**3,920,306**

**TAP CONNECTIONS FOR MULTI-CONDUCTOR CABLES**

**Miles Edmond Barnett, Jr., Kernersville; George Hails Foster, Jr., Winston-Salem, and George Allen Patton, Pfafftown, all of N.C., assignors to AMP Inc., Harrisburg, Pa.**

**Filed Oct. 2, 1974, Ser. No. 511,883**

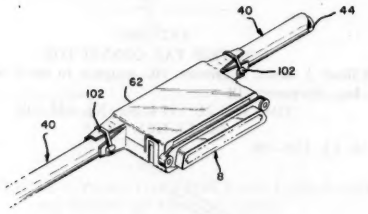
**Int. Cl.[2] H01R** *13/58*

**U.S. Cl. 339—103 M** **16 Claims**

**8.** A housing for enclosing a tap on a multi-conductor cable said tap comprising an electrical connector having a mating side and a rearward side, a plurality of contact terminals in said connector, each of said terminals having a wire-receiving portion at said rearward side, the wires in said cable extending from said cable to said rearward side and being in said wire-receiving portions of said terminals, said wires extending from said terminals back to said cable, said housing comprising:

first and second cover members, said cover members being connected to each other clamshell fashion along one side thereof, said side constituting a rear side and having hinge means whereby said cover members can be moved from an open position to a closed position,

each of said cover members comprising a panel section extending from said rear side, each of said panel sections having flanges extending from opposite side edges thereof, said panel sections said flanges, and said rear side forming an enclosure when said cover members are closed, said enclosure having an open side which is opposite to said rearward side




internal surface portions of said enclosure which are proximate to open side conforming to said rearward side of said connector,

cable openings in said flanges adjacent to said rear side, said openings conforming in size to said cable, and

means for latching said cover members to each other in said closed position whereby,

portions of said cable adjacent to said connector can be positioned in said cable openings and said cover members can be closed onto said rearward side of said connector whereby said wires extending from said cable to said connector will be contained in said enclosure.

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**3,920,307**

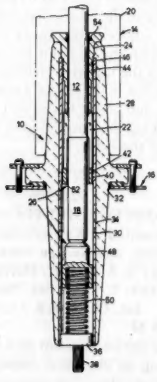
**ARC-OUT SHUT OFF VALVE ASSEMBLY FOR A HIGH VOLTAGE BUSHING**

**Clarence B. Burns, Oconomowoc, Wis., assignor to RTE Corporation, Waukesha, Wis.**

**Filed Aug. 21, 1974, Ser. No. 499,325**

**Int. Cl.[2] H01R** *13/52*

**U.S. Cl. 339—111** **12 Claims**




1. A high voltage cable termination bushing for connecting an electrical apparatus to an electrically conductive probe having an arc extinguishing rod on the end, said bushing comprising: a housing formed from an insulating material and having a passage, said housing being adapted to be mounted in the entrance to a housing for an electrical apparatus, an electrically conductive member supported within said passage intermediate the ends thereof, electrically conductive means closing one end of said passage, said conductive means being electrically connected to said conductive member for connecting said bushing to the apparatus within the housing, valve means positioned within said passage between said conductive member and said conductive means for trapping gases between said member and said conductive means, said valve means being normally in a closed position and opened by the arc extinguishing rod on the end of the probe on cable termination, on withdrawal of the probe the valve means will close to prevent the escape of gases trapped in the passage.

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**3,920,308**

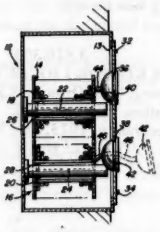
**READY STORED POWER CORD**

**Harry C. Murray, 4417 Teays Valley Road, Scott Depot, W. Va. 25560**

**Filed Apr. 1, 1974, Ser. No. 456,773**

**Int. Cl.[2] H01R** *13/72*

**U.S. Cl. 339—119 C** **9 Claims**



1. A ready stored power cord assembly, comprising, in combination:

a. a receptacle having a back wall and an opening opposite the back wall; and

b. a spool slidably arranged in the receptacle for movement through the opening between a position entirely within the receptacle and a position outside of the receptacle, a stud being cantilever mounted on the back wall of the receptacle and arranged extending toward the opening, and a slot being provided in the stud, the spool being slidably mounted on the stud and provided with a guide pin slidably inserted into the slot for permitting limited sliding movement of the spool along the extent of the stud.

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**3,920,309**

**STACKABLE ELECTRICAL CONNECTOR ASSEMBLY**

**William Joseph Garver, Harrisburg, Pa., assignor to AMP Incorporated, Harrisburg, Pa.**

**Filed Apr. 18, 1974, Ser. No. 461,833**

**Int. Cl.[2] H01R** *9/00*

**U.S. Cl. 339—198 G** **4 Claims**

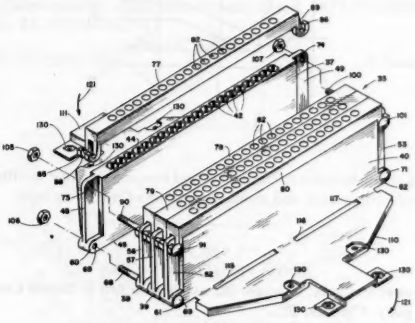
1. A connector assembly comprising:

a plurality of side-by-side housings each having a plurality of contact receiving holes therein;

a plurality of faceplates each overlying and engaging a corresponding one of said housings and having contact access holes therethrough;

means engaging said housings and faceplates for coupling each of said faceplates and its said corresponding housing

and securing said housings in side-by-side positions; and strain relief means attached to at least two of said housings moveable to a position adjacent each other to retain therebetween conductors running to said contacts.



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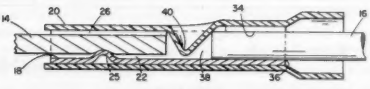
**3,920,310**

## INSULATED ELECTRICAL CONNECTOR WITH WIRE STOP

**Richard S. Walsh, Foxboro, and Donald R. Weber, Walpole, both of Mass., assignors to Ark-Les Switch Corporation, Watertown, Mass.**

**Filed Aug. 1, 1974, Ser. No. 493,764**
**Int. Cl.² H01R** *11/22*
**U.S. Cl. 339—256 SP** **2 Claims**



**1.** A preinsulated, crimpable, electrical connector including a metal body having at its rear end crimpable wire receiving elements and at its forward end elements for selectively receiving a connecting terminal

said body comprising a single piece of sheet metal formed into a central base portion having forward and rearward portions longitudinally spaced from one another, said rearward portion having at its rearward end wall portions bent upward with an open end for receiving a connecting wire for crimping thereto

an insulating plastic sleeve of generally uniform thickness surrounding said body

said sleeve having an inwardly deformed wire stop means for stopping a wire received in said wire receiving elements during assembly from extending into said terminal receiving elements before being crimped therein, said wire stop means being in the form of an indentation on the outer surface of said sleeve extending inwardly from the inner wall of said sleeve to a position closely adjacent and opposed to the inner wall of said central base portion generally centrally transversely thereof and located between said forward and rearward portions.

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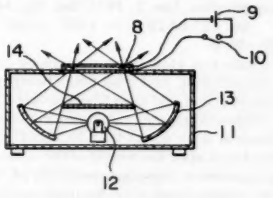
**3,920,311**

## MICROSCOPE ILLUMINATOR USABLE BOTH FOR BRIGHT FIELD ILLUMINATION AND DARK FIELD ILLUMINATION

**Hiroshi Tsuda, Mitaka, and Kensaku Miyazaki, Machida, both of Japan, assignors to Olympus Optical Co., Ltd., Tokyo, Japan**

**Filed May 10, 1974, Ser. No. 468,987**
**Claims priority, application Japan, May 11, 1973, 48-52299**
**Int. Cl.² G02B** *21/06, 21/10;* **G02F** *1/13*
**U.S. Cl. 350—89** **2 Claims**



**1.** A microscope illuminator usable for alternative dark field illumination and bright field illumination of an observation optical system comprising a light source; a shield plate disposed in the optical path between said light source and said optical system to prevent the light beams emerging from said light source from being directly incident along said optical path on the observation optical system of the microscope; a liquid crystal cell composed of two glass plates disposed in said optical path, provided on their opposing surfaces with a transparent electrode and enclosing liquid crystal therebetween and having a light transmitting state causing dark field illumination and a light diffusing state causing bright field illumination; an electrical switch and a power supply which is connected via said switch to said transparent electrodes of said liquid crystal cell so that the light conduction of said cell can be shifted from said transmitting to said diffusing state and vice versa by operation of said switch.

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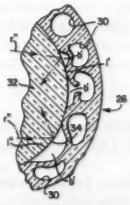
**3,920,312**

## OPTICAL FIBER WITH POROUS CLADDING

**Walter P. Siegmund, Woodstock, Conn., assignor to American Optical Corporation, Southbridge, Mass.**

**Filed Aug. 28, 1972, Ser. No. 284,189**
**Int. Cl.² G02B** *5/14*
**U.S. Cl. 350—96 R** **8 Claims**



**1.** A clad light-conducting fiber comprising:

a core of high refractive index light-conducting material; and

a relatively thin substantially uniform thickness of cladding material of relatively low refractive index surrounding said core, said cladding material containing a series of channels extending longitudinally throughout at least a major portion of its length and said core and cladding material being interfacially interconnected for transmit-

ting light through said fiber by total internal reflection along said interfacial connection.

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**3,920,313**

## SIZING COMPOSITION AND GLASS FIBERS SIZED THEREWITH

**Robert Wong; Martin C. Flautt, both of Granville, and Richard M. Haines, Warsaw, all of Ohio, assignors to Owens-Corning Fiberglas Corporation, Toledo, Ohio**

**Division of Ser. No. 150,723, June 7, 1971, Pat. No. 3,772,870. This application Apr. 2, 1973, Ser. No. 347,032**

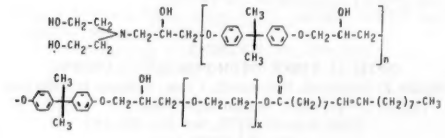
**Int. Cl.[2] G02B** *5/14*; **C03C** *25/02*

**U.S. Cl. 350—96 B** **8 Claims**

1. Light conducting glass fibers comprising core and cladding glass compositions, said glass fibers being in the form of an integral bundle, and said glass fibers having a dried coating of a sizing composition thereon, said coating being present on the glass fibers at from about 0.25 to about 3.0 percent by weight solids, based upon the weight of the coated glass fibers, said sizing composition consisting essentially of, when applied, in percent by weight, based upon the total weight of the sizing composition:

| Ingredients | Percent By Weight |
|---|---|
| Dispersion solids of polyvinyl acetate in water | .5 to 20.0 |
| Polyoxyethylene sorbitan tristearate | 0.1 – 5.0 |
| Polyoxyethylene sorbitan trioleate | 0.1 – 5.0 |
| Polyvinyl pyrrolidone | 0.1 – 5.0 |
| Water dispersible epoxy resin | .5 to 20.0 |
| Acetic acid | to a pH of 3.0 – 7.0 |
| Deionized water | balance |

said water dispersible epoxy resin having the formula:



wherein $n$ equals 3.6 and $x$ equals 8 to 10.

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**3,920,314**

## MODE CONVERSION AND MODE SEPARATION BRANCHED DIELECTRIC WAVEGUIDE ELEMENT FOR LIGHT

**Hiroyoshi Yajima, Tokyo, Japan, assignor to Agency of Industrial Science and Technology, Tokyo, Japan**

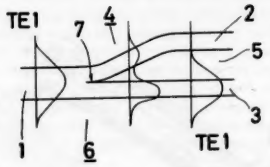
**Filed Mar. 12, 1974, Ser. No. 450,333**

**Claims priority, application Japan, June 5, 1973, 48-62559**

**Int. Cl.[2] G02B** *5/14*

**U.S. Cl. 350—96 WG** **6 Claims**

1. A mode conversion and mode separation branched waveguide element for incoming light comprising a first light transmission line formed of a dielectric material having a refractive index larger than that of the surrounding material and a second light transmission line formed of a dielectric material having a refractive index larger than that of the surrounding material, said lines being separate and non-contacting over a portion thereof and being connected at an angle to each other at one end, said first transmission line being different in optical characteristics from said second transmission line to effect mode conversion and mode separation of incoming light.

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**3,920,315**

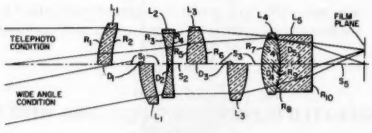
## ZOOM PROJECTION LENS

**Walter R. Linke, Chicago, Ill., assignor to Bell & Howell Company, Chicago, Ill.**

**Filed Oct. 15, 1974, Ser. No. 514,340**

**Int. Cl.[2] G02C** *15/00*, *3/04*

**U.S. Cl. 350—184** **1 Claim**




1. An optical system of a highly corrected zoom projection lens including a combination of glass and plastic elements, at least one of the plastic elements having an aspheric surface, the system having substantially the following specifications:

TABLE 1

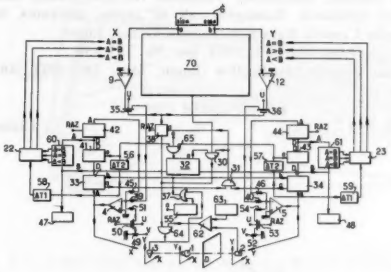
| LENS | RADII (IN.) | THICKNESS (IN.) | SPACINGS (IN.) |
|---|---|---|---|
| $L_1$ | $R_1$ = 0.8665 | $D_1$ = .1500 | |
| | *$R_2$ = 1.41168 | | $S_1$ = .5900 to .1500 |
| $L_2$ | *$R_3$ = 0.88773 | $D_2$ = .0500 | |
| | $R_4$ = 2.7005 | | $S_2$ = .1500 to .5900 |
| $L_3$ | $R_5$ = 2.4600 | $D_3$ = .2050 | |
| | *$R_6$ = 0.96869 | | $S_3$ = .5900 to .1500 |
| $L_4$ | $R_7$ = 0.6410 | $D_4$ = .2020 | |
| | $R_8$ = 0.8494 | | $S_4$ = .0007 |
| $L_5$ | $R_9$ = 0.8390 | $D_5$ = .3365 | |
| | $R_{10}$ = 36.2503 | | $S_5$ = .5521 BFL |

wherein the first column lists the lens element numerically starting at the ray exit side of the system, the plastic elements having the same dispersive index and refractive index i.e., $V$=57.4 and $N_D$=1.4917, glass element $L_4$ having a dispersive index V of 58.6 and a refractive index $N_D$ of 1.613, the glass element $L_3$ having a dispersive index V of 26.1 and a refractive $N_D$ of 1.785; the second column lists the respective radii and vertex radii of the aspheric surfaces *$R_2$, *$R_3$, and *$R_6$, the negative (−) values of the radii indicate surfaces which are concave; the third column lists the thickness $D_1$ to $D_5$ of the respective elements; and the fourth column lists the axial spacings $S_1$ to $S_5$ between the respective elements and the image plane.

## 3,920,316
## ELECTRONIC CONTOUR FOLLOWER

**Claude Daguillon, Chatillon-sous-Bagneux, France, assignor to Compagnie de Signaux et d'Entreprises Electriques, Chatillon-sous-Bagneux, France**

**Filed Jan. 3, 1974, Ser. No. 430,546**
**Claims priority, application France, Jan. 8, 1973, 73.00459; Oct. 23, 1973, 73.37817**
**Int. Cl.[2] G05B** *1/00*
**U.S. Cl. 250—202** **8 Claims**



1. A contour follower for analyzing data supported on a bidimensional source of data, said contour follower comprising a reading head adapted to produce a coincidence output pulse each time the data read by the reading head lies within a predetermined range of values, actuator means coupled to the reading head for displacing the reading head relative to the source of data along two axes of coordinates, recorder means for recording the coordinates of the reading head for each of said coincidence pulses, said recorder means providing a status signal when ready to record new data after having recorded the coordinates of the reading head at each coincidence pulse, generator means having first and second outputs and adapted for providing on said outputs first and second sinewave signals having predetermined phase-shift one relative to the other, first and second summing circuits each having first and second inputs and an output; first and second switching means respectively connecting the first and second outputs of the generator means to the respective first inputs of the first and second summing circuits, first and second storage means each having an input and an output, the respective inputs of the first and second storage means being connected to the respective outputs of the first and second summing circuits and the respective outputs of the first and second storage means being connected to the respective second inputs of the first and second summing circuits, the outputs of the summing circuits being connected to the actuator means, gating means connected to the storage means and to the reading head for controlling the storage of the respective sinewave signals into the storage means at each coincidence pulse, and control means adapted for closing said first and second switching means at each occurrence of a status signal and for opening said switching means after the sinewave signals have been stored into storage means.

## 3,920,317
## BIASING RING FOR SPECTACLES

**Hermann Eckardt Kell, P.O. Box 244, Sault Ste. Marie, Ontario, Canada**

**Filed Apr. 30, 1973, Ser. No. 355,525**
**Claims priority, application Canada, Nov. 23, 1972, 157225**
**Int. Cl.[2] G02C** *5/16*
**U.S. Cl. 351—113** **6 Claims**

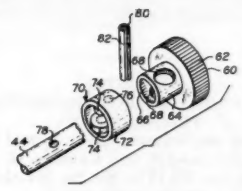
1. An annular elastomeric member having a wedge-shape and which tapers continuously from a first point on the circumference of said member to a diametrically opposite second point on said circumference, said member having a center opening and being adapted to surround a hinge connecting a temple member and a frame member of a pair of eyeglasses, the interposition of said member effecting the exertion of a

biasing force between the temple member and the temple of a wearer, and manual rotation of said member effecting a continuous variation in the strength of said biasing force due to the wedge-shape of said member.

## 3,920,318
## FILM DRIVE ASSEMBLY

**James Frezzolini, Ringwood, N.J., assignor to Frezzolini Electronics, Inc., Hawthorne, N.J.**

**Filed Aug. 23, 1974, Ser. No. 500,034**
**Int. Cl.[2] G03B** *31/00*
**U.S. Cl. 352—35** **7 Claims**



1. A film drive assembly for moving a film in a movie camera comprising a support plate; a drive shaft adapted to be driven by a motor; mounting means for rotatably mounting said drive shaft on said support plate; a film claw driven by said shaft; film moving means mounted on said support plate for moving the film past a preselected point; and gearing means connected to said shaft and in driving relationship with said film moving means to drive said film moving means; said gearing means comprising a gear in meshing engagement with said film moving means, and connecting means for connecting said gear to said shaft; said gear comprising a hub portion; and said connecting means comprising a pin extending through said hub portion and said shaft to connect said pin in driving engagement with said shaft, and a resilient member between said hub and said pin.

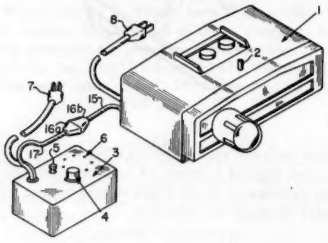
## 3,920,319
## SOUND SENSOR AND ADAPTER

**Richard W. Bryant, State College, Pa., assignor to Nova Productions, Inc., Butler, Pa.**

**Filed Oct. 4, 1974, Ser. No. 512,348**
**Int. Cl.[2] G03B** *19/18*
**U.S. Cl. 352—39** **2 Claims**

1. In combination a sound sensor and an adapter actuated thereby suitable for installation on a movie projector, the adapter including a solenoid S having a solenoid plunger actuated thereby and a mechanical linkage connected between the plunger and a mechanical stop action means of the projector, the sound sensor comprising a first circuit having a relay switch RLY in series with the solenoid S and a plug P connectable to an AC power source; a second series circuit including a rectifier or DC power supply circuit, a normally

closed reset switch RSW and a coil of relay RLY and an anode and cathode of an electronic switch (SCR); and a third circuit comprising a transducer suitable for detecting a sharp audible report and converting it to an electrical signal, amplifiers for amplifying said signal and an adjustable attenuation device for adjusting the sensitivity of the stop action circuit and the gate circuit of the electronic switch SCR such that when the transducer detects a sharp report, the pulse at the gate of the



electronic switch (SCR) causes it to enter its conducting state and thereby permits a continuous DC current to pass through the relay switch RLY thereby holding it closed for passing current to the solenoid until the normally closed reset switch RSW is opened, the mechanical linkage comprising a lever arm pivotably connected at one end to a support and at a second end to the mechanical stop action means, said plunger being pivotably connected to the lever arm intermediate its ends.

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**3,920,320**

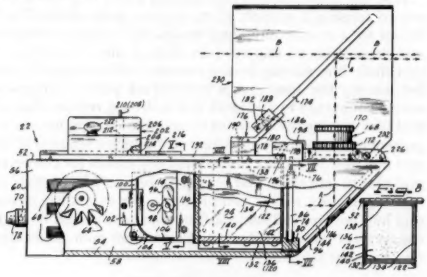
**PROJECTOR FOR FRONT PROJECTION PHOTOGRAPHY**

**Donovan K. Ellis, and William P. Ryan, both of Northbrook, Ill., assignors to Lumi-Tek, Inc., Glenview, Ill.**

**Filed Apr. 19, 1974, Ser. No. 462,324**

**Int. Cl.[2] A63J** *5/09*

**U.S. Cl. 352—89** **9 Claims**



1. A projector for projecting an image onto a screen, comprising:

a housing;

a holder mounted in said housing for holding a transparency bearing an image to be projected onto the screen;

a light diffuser mounted in said housing adjacent said holder to receive light and transmit the received light to the transparency as diffused light;

a modeling light source in said housing for generating and transmitting modeling light to said diffuser; and

a strobe light source in said housing for generating and transmitting a flash of light to said diffuser,

said diffuser comprising

a mirrored light passageway to receive light from said sources,

a filter at the inlet of said light passageway to block radiation in the infrared portion of the light spectrum, and

a ground glass plate at the outlet of said light passageway to direct diffused light to said holder.

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**3,920,321**

**ELECTROMAGNETIC RELEASE DEVICE FOR A MOTOR DRIVEN MOTION PICTURE CAMERA**

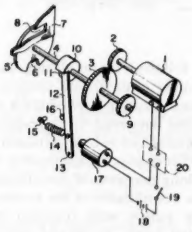
**Isamu Kubota, Izumisano; Yoshihisa Hayashi, Sakai, and Teruo Ichikawa, Gamagori, all of Japan, assignors to Minolta Camera Kabushiki Kaisha, Osaka, Japan**

**Filed Mar. 22, 1972, Ser. No. 237,134**

**Claims priority, application Japan, Mar. 26, 1971, 46-18078**

**Int. Cl.[2] G03B** *1/00*

**U.S. Cl. 352—177** **1 Claim**



1. A motor driven motion picture camera comprising:

a driving motor;

a rotatable main shaft driven by said driving motor for driving a camera mechanism including a film driving means for transmitting said film successively to an aperture, and a shutter blade for exposing said film facing toward said aperture successively;

a stopper fixedly mounted on said main shaft;

a retaining member having an armature biased to engage with said stopper for restraining said main shaft in a position as to shield said aperture from a scene light with said shutter blade;

an electromagnet for attracting said armature to disengage said retaining member from said stopper, thereby releasing said restrainment of said main shaft;

a normally opened switch means closed in response to a camera release operation;

a power source connected in series in a loop solely with said electromagnet, said driving motor and said switch means respectively; and

said electromagnet being arranged so that the current running through the coil of said electromagnet required for attracting said retaining member to release said main shaft as compared to the current running through said loop is smaller than the lowest starting current required for said motor to actuate said camera mechanism, whereby the release and actuation of the camera mechanism is controlled solely by said electromagnet and said motor.

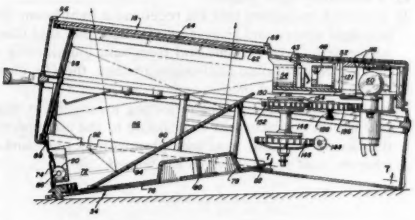
## 3,920,322
## MICRO FILM VIEWER

**Arnis E. Peters, La Crosse, Wis., assignor to Northern Engraving Company, Inc., Sparta, Wis.**

**Division of Ser. No. 175,123, Aug. 26, 1971, Pat. No. 3,784,728, which is a continuation-in-part of Ser. No. 90,514, Nov. 18, 1970, Pat. No. 3,700,321. This application Jan. 2, 1974, Ser. No. 429,579**

**Int. Cl.[2] G03B** *21/28, 23/12*

**U.S. Cl. 353—26** **6 Claims**



1. In a microfilm viewer, for receiving therein a reel-to-reel film cassette of microfilm and for illuminating, projecting, enlarging and displaying a selected frame of the microfilm upon a viewing screen, and the path of projection of the illuminated frame including first and second mirror means and a viewing screen, the improvement comprising, in combination: elongated housing means for housing therein illuminating means and projection means and including an elongated upper casing having a viewing screen mounted therein at the distal end and a cassette receiving compartment provided therein at the proximal end, means carried by the upper casing for maintaining fixed optical alignment of a film cassette with said illumination means and projection means, and fixed optical attitude of the viewing screen and of said first mirror means against which the illuminated image is projected by the projection means, a movable lower casing part, the second mirror means being fixedly positioned upon said lower casing part and being movable with said lower casing part between an inoperative, stored-away position and an operative position in which the second mirror means is deployed to receive the image reflected from the first mirror means and to reflect same upon the viewing screen, said movable lower casing part serving in its operative position as part of the support means for the viewer so as to incline the viewing screen relative to a support surface upon which the viewer may be positioned, the second mirror means being supported on the movable lower casing part at an incline to the exterior surface plane of the lower casing part, and the exterior surface of said lower casing part being indented toward the second mirror means carried thereon, to provide a recessed storage compartment for a power cord for the viewer.

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## 3,920,323
## APPARATUS FOR PROJECTING AN OBJECT

**Tatsuro Nishitani, Tokyo, Japan, assignor to Nihon Kyozu Kabushiki Kaisha, Tokyo, Japan**

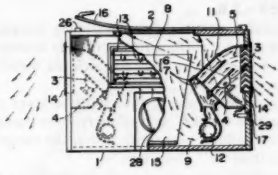
**Filed Oct. 18, 1974, Ser. No. 516,005**

**Claims priority, application Japan, Oct. 22, 1973, 48-122606; Feb. 15, 1974, 49-17685**

**Int. Cl.[2] G03B** *21/06, 21/16*

**U.S. Cl. 353—61** **4 Claims**

1. In an apparatus for projecting the image of an object, of the type comprised of a housing body, a place for locating an object whose image is to be projected, and optical means including at least one electric illuminating bulb, a reflector and a projecting lens arrangement so positioned relative to each other and relative to said place for locating an object as to together define a path for illuminating light, a cooling arrangement, comprising, in combination, divider means dividing the interior space of said housing body into a first space containing said electric illuminating bulb and into a second space accommodating the major portion of said path for illuminating light; means defining a ventilation outlet communicating with said first space and a ventilation inlet communicating with said second space; and fan means mounted intermediate said first and second spaces and operative for drawing cooling air in through said inlet and through said second space to cool the latter and for discharging such air into said first space and out through said outlet for cooling said illuminating bulb.



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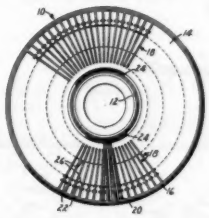
## 3,920,324
## SLIDE TRAY

**Robert B. Otto, Champlin, Minn., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.**

**Continuation-in-part of Ser. No. 376,888, July 5, 1973, Pat. No. 3,873,195. This application Oct. 3, 1974, Ser. No. 511,671**

**Int. Cl.[2] G03B** *23/06*

**U.S. Cl. 353—117** **1 Claim**



1. A circular slide tray comprising:

a cylindrical hub,

a base wall extending from one end of said hub perpendicular to the axis of said hub,

a peripheral edge wall extending perpendicularly from said base wall around said hub to define an annular slide receiving area between said edge wall and said hub,

a plurality of similar equally spaced slide guide walls extending from said peripheral edge wall radially inward toward said hub and terminating spaced from said hub to provide close packing of adjacent slides at said hub, two adjacent guide walls defining with said edge wall and said hub a slide receiving slot,

a strip of material extending around said hub and having straight fibers extending radially therefrom into each of said slide receiving slots to guide a slide as it is moved into a said slot and to apply pressure to the edge of the slide adjacent said hub to retain the slide in said slot, and

means adapted to engage a slide projector for stepwise advancement of said tray to align successive slide receiving slots with a slide pusher bar and a fixed opening in the projector into which a slide is to be pushed,

said base wall being formed with openings communicating with each of said slide receiving slots for access by the slide pusher bar and movement thereof parallel to the axis of said hub to move a slide from a said slot into the fixed opening in the projector.

## 3,920,325
## MOISTURE STABLE BIAS TRANSFER ROLL

**Joseph A. Swift, Ontario, N.Y., assignor to Xerox Corporation, Stamford, Conn.**

**Filed Sept. 9, 1974, Ser. No. 504,471**
**Int. Cl.² G03G** *15/16*
**U.S. Cl. 355—3 R** **7 Claims**

1. A transfer member for electrically cooperating with a conductive support surface to electrically attract charge particles from the support surface towards the member including:

a. a conductive support;

b. a primary elastomeric intermediate layer overlying said conductive support, said primary layer having a relatively constant volume resistivity within the range of about $10^7$ to less than $10^{11}$ ohms cm;

c. a secondary elastomeric intermediate layer overlying said primary layer, said secondary layer having a relatively constant volume resistivity within the range of about $10^{11}$ to $10^{15}$ ohms cm; and

d. a polymeric overcoating layer overlying and hermetically sealing said layers, said overcoating layer having a substantially uniform thickness of less than about 5 mils and a moisture permeability content of less than about $1 \times 10^{-8}$ at 30°C.

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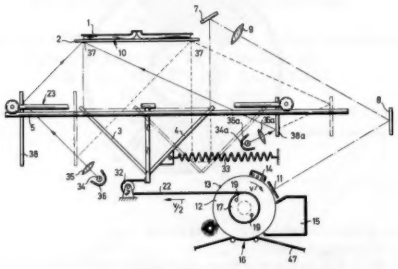
## 3,920,326
## ELECTROPHOTOGRAPHIC COPYING APPARATUS

**Heimo Hirth, Frankfurt am Main, Germany, assignor to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany**

**Filed Nov. 18, 1974, Ser. No. 524,895**
**Claims priority, application Germany, Nov. 19, 1973, 2357582**
**Int. Cl.² G03G** *15/28*
**U.S. Cl. 355—8** **30 Claims**



1. An electrophotographic copying apparatus, comprising:

A. a photoconductive surface;

B. means for rotating said photoconductive surface;

C. means for uniformly charging said photoconductive surface;

D. a slotted diaphragm arranged in front of the photoconductor and transversely to its direction of movement, through which the photoconductor surface is exposed;

E. a planar transparent support surface for an original image to be copied;

F. optical means for reproducing said original image upon said photoconductive surface, said optical means comprising

i. a first stationary lens for directing a scanned image from said original image to said photoconductive surface;

ii. a reflecting arrangement adapted for displacement along a straight line, said arrangement comprising

a. at least two scanning reflecting elements rigidly joining with one another in fixed angular relationship, whereby, when said original image is scanned, a moving visual image is produced behind said scanning reflecting elements from the view point of said first stationary lens, and

b. at least one illuminating reflecting element rigidly connected to said scanning reflecting elements and arranged at such an angle to said original image supporting surface that a normal to said illuminating reflecting element, a normal to said original image, and said straight line of displacement lie in a single plane, said straight line of displacement being defined such that said moving virtual image is displaced in a direction also lying in said plane when said reflecting arrangement is displaced along said line;

G. a stationary light source;

H. a second stationary lens for receiving a light beam from said light source and projecting said light into said illuminating reflecting element and from said illuminating reflecting element onto said original image, thereby illuminating the original image, and

I. means for displacing said reflecting arrangement along said line of displacement in response to the circumferential speed of said rotating photoconductive surface whereby said original image is scanned.

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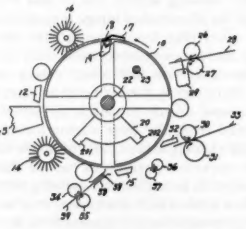
## 3,920,327
## AUTOMATIC MASTER PAPER EXCHANGE FOR A COPYING MACHINE

**Ituro Kato, Nara, Japan, assignor to Sharp Kabushiki Kaisha, Osaka, Japan**

**Filed May 17, 1974, Ser. No. 470,792**
**Claims priority, application Japan, May 17, 1973, 48-57939[U]**
**Int. Cl.² G03G** *15/00*
**U.S. Cl. 355—14** **7 Claims**

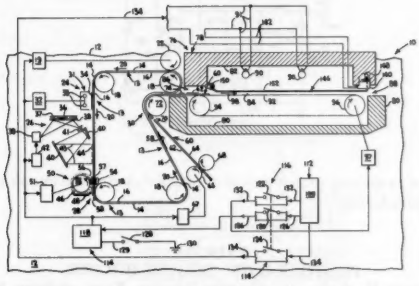


1. An automatic master paper exchange apparatus for a copying machine of the type wherein a master paper repeatedly usable for the copying process rotates around a rotary drum with the revolution of the drum, which comprises a rotary drum, holding means operatively associated with the drum for gripping a leading edge of the master paper in order to wind the master paper around the rotary drum, a rotatable plate rotatably disposed about the shaft of the rotary drum, said rotatable plate being rotatable without regard to the rotation of the shaft, a dog for transferring the torque of the rotary drum to the rotatable plate, means for coupling the holding means with the dog in order to swing the holding means in unison with the dog, a stopper adapted to engage the rotatable plate which swings the dog to disengage from the rotatable plate thereby discontinuing the rotation of the rotatable plate and means for shifting the stopper to an operative position at a time when the exchange of the master paper is desired.

## 3,920,328
## ADJUSTABLE PAPER JAM RESPONSIVE DEVICE FOR AN ELECTROSTATIC COPIER

**John A. Toto, Milford, and Salvatore J. Calvi, Stamford, both of Conn., assignors to Pitney-Bowes, Inc., Stamford, Conn.**

**Filed July 24, 1974, Ser. No. 491,240**
**Int. Cl.² G03G *15/20***
**U.S. Cl. 355—14** **4 Claims**



1. An electrostatic copier including means for forming a developed image on a sheet of paper, an enclosure within which the developed image is heatable for bonding to the sheet of paper, electrically energizable means for heating the developed image, a source of supply of electrical power from which the heating means is energizable, means for moving the sheet of paper in a predetermined path of travel within the enclosure, and means for disabling energization of the heating means in response to the sheet of paper becoming jammed within the enclosure, said disabling means comprising:

a. switching means for electrically connecting the heating means to the source and disconnecting the heating means therefrom;

b. a grating disposed to obstruct the passage of the sheet of paper out of said predetermined path of travel, the grating pivotally attached to the enclosure for movement in and out of contact with the switching means to respectively connect the heating means to the source and disconnect the heating means from the source, the grating being normally held in contact with the switching means by gravity and being movable out of contact with the switching means by the sheet of paper, and

c. an adjustable weight attached to the grating for balancing the weight of the grating about the pivot axis of the grating, and said adjustable weight adapted to be sufficiently adjustable to permit adjustment thereof for pivoting the grating both into and out of contact with the switching means to facilitate adjusting the weight of the grating on the switching means to a predetermined level ensuring pivotal movement of the grating by the sheet of paper in the event that the paper moves out of said predetermined path of travel and into contact with the grating.

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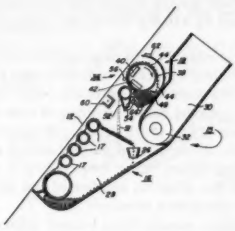
## 3,920,329
## BACKGROUND REMOVAL APPARATUS

**Richard H. Dennie, Walworth, and Michael R. Stanley, Pittsford, both of N.Y., assignors to Xerox Corporation, Stamford, Conn.**

**Filed Sept. 25, 1974, Ser. No. 508,953**
**Int. Cl.² G03G *21/00***
**U.S. Cl. 355—15** **6 Claims**

1. The combination of a developer having a first sump with a background removal apparatus having a second sump, the background removal apparatus being positioned above the first sump, and including (a) means for transporting magnetic carrier beads into sweeping contact with a photoreceptor to remove background toner, the transporting means including a rotatably mounted non-magnetic cylinder and magnet means positioned within the cylinder so as to permit the carrier beads to drop freely from the cylinder into the second sump after sweeping the photoreceptor and then to be reattracted to the



cylinder again after being mixed within the second sump, and (b) reclaim means for reclaiming the toner from the carrier beads which are being transported into sweepingg contact with the photoreceptor.

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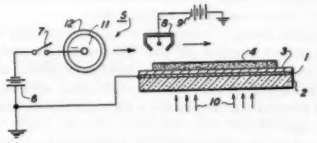
## 3,920,330
## ELECTROPHORETIC IMAGING APPARATUS

**John B. Wells, Savannah; Paul C. Swanton, Webster; John W. Weigl, W. Webster, and Edward Forest, Rochester, all of N.Y., assignors to Xerox Corporation, Stamford, Conn.**

**Division of Ser. No. 290,618, Sept. 20, 1972, Pat. No. 3,850,627, which is a continuation of Ser. No. 104,389, Jan. 6, 1971, abandoned. This application Aug. 19, 1974, Ser. No. 498,693**
**Int. Cl.² G03G *15/00***
**U.S. Cl. 355—3** **6 Claims**



1. An imaging apparatus comprising

a. a first electrode comprising a photoconductive insulating layer carrying a layer of material capable of transporting at least one species of charge carrier;

b. a second electrode;

c. a source of D.C. potential for applying an electrical field between said first and second electrodes and across a layer of a suspension of particles in an insulating liquid arranged between said electrodes; and

d. projection means for exposing said photoconductive insulating layer to a pattern of activating radiation.

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## 3,920,331
## PHOTOCOPYING MACHINE

**Takaji Kurita, Kawachinagano, and Takao Fujiwara, Sakai, both of Japan, assignors to Minolta Camera Kabushiki Kaisha, Osaka, Japan**

**Filed Mar. 20, 1974, Ser. No. 453,024**
**Claims priority, application Japan, Mar. 30, 1973, 48-37293**
**Int. Cl.² G03G *15/00***
**U.S. Cl. 355—16** **2 Claims**

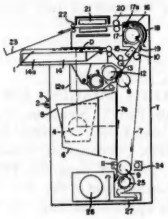
1. In a dry transfer process photocopying machine including generally horizontal, transparent support means for support of original documents to be copied, copy paper reserve means for storing a supply of copy sheets, charging means, full frame instantaneous exposure means, image developing means, image transfer means, cleaning means and a photosensitive member in the form of a belt, said photosensitive member

being exposed to an image of an original document by said exposure means subsequent to uniform application of charges by said charging means and developed by said developing means prior to transfer of said image onto a sheet of copy paper fed from said reserve means, and said copy paper being subsequently fixed by a fixing means, the improvements which comprise:

means for supporting and rotating said photosensitive member and including a plurality of rollers, said photosensitive member being supported vertically with respect to said transparent support means and one of said rollers having a small radius of curvature defining an uppermost portion of said vertically supported photosensitive member;

said developing means being located below said roller of small radius but adjacent another of said rollers supporting the photosensitive member;

said image transfer means being located adjacent said small radius roller for transferring a developed image onto a



sheet of copy paper fed from said reserve means and through a feeding means located adjacent but between said developing and transfer means;

a first guide means of dielectric material located immediately above said small radius roller;

a rotatable drum of conductive material located above said uppermost portion of the photosensitive member and leading to a suction means, said rotatable drum formed with plurality of portions through which air may be drawn and rotated synchronously with said photosensitive member; and

a second guide means separate from said first guide means and located generally parallel to a portion of the outer periphery of said drum and made of dielectric material; whereby said sheet of copy paper to which an image has been transferred is separated from said photosensitive member by said small radius roller with the aid by said first guide means and guided by said drum to said fixing means.

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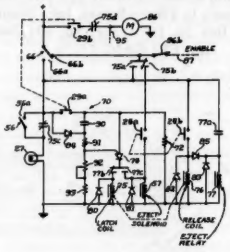
**3,920,332**

## CARTRIDGE OR CASSETTE CONTROL SYSTEM WITH AN AUTOMATIC FINAL RUN AT THE END OF A WEB

**Robert W. Murre, Chicago, and George W. Bookless, Franklin Park, both of Ill., assignors to Bell & Howell Company, Chicago, Ill.**

**Filed May 28, 1974, Ser. No. 473,467**
**Int. Cl.[2] G03B** *27/32, 27/52, 23/02*
**U.S. Cl. 355—64** **7 Claims**

**1.** A web transport system for use in connection with a cartridge containing said web, said system comprising means for receiving said cartridge, solenoid controlled latch means cooperating with one or more keeper slots formed in the housing of a cartridge for capturing said cartridge, means for driving said web through said cartridge while said cartridge is captured, spacing means for operating said driving means during a predetermined period of time for causing a space run sequence whereby a predetermined length of web is driven through said cartridge, control circuit means to retain said capture and to prevent ejection of said cartridge until the space run sequence has been completed, which holds open a circuit to said solenoid while it operates to drive the web during said predetermined period of time, and means responsive to the end of that period of time for closing the circuit to said solenoid.



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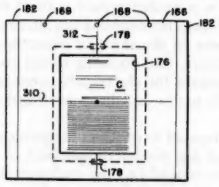
**3,920,333**

## PHOTOGRAPHIC SUBJECT HOLDER

**Joseph H. Wally, Jr., Shawnee Mission, Kans., assignor to Filminiature Systems, Inc., Kansas City, Mo.**

**Division of Ser. No. 288,265, Sept. 12, 1972, Pat. No. 3,837,742. This application Aug. 1, 1974, Ser. No. 493,510**
**Int. Cl.[2] G03B** *27/62, 27/64*
**U.S. Cl. 355—76** **6 Claims**



**1.** In a camera, a rectangular shaped subject holder including a perforated board connected to an air evacuating source having spaced registration pins adjacent one edge thereof and a sheet-like flexible carrier member having mounting apertures along one edge spaced to receive the registration pins of the subject holder, said carrier having a central opening over which copy to be photographed may be fixed, the center of said opening in the carrier being related to the mounting apertures thereof such that when mounted on the subject holder by means of its registration pins the copy is centered by the carrier on the optical axis of the objective lens of the camera, the lateral dimensions of said carrier being greater than the corresponding dimensions of the subject holder such that a portion of the carrier lengthwise of at least one side of the carrier protrudes beyond the perforated board and is useful for grasping by the operator in mounting and dismounting the carrier from the subject holder.

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**3,920,334**

## DUAL PURPOSE DETECTOR FOR A LIQUID CHROMATOGRAPH

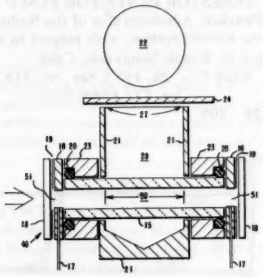
**John Carl Steichen, and Sydnor H. Bryne, Jr., both of Newark, Del., assignors to E. I. Du Pont de Nemours & Co., Wilmington, Del.**

**Filed Nov. 13, 1973, Ser. No. 415,440**
**Int. Cl.[2] G01N** *21/00*
**U.S. Cl. 356—73** **7 Claims**

**1.** A detector to monitor the constituents of the effluent emerging from a liquid chromatographic column, comprising a. a longitudinal flow cell for the liquid emerging from the

column, said flow cell having a longitudinal axis parallel to the path of liquid flow through the flow cell, at least one side wall with a portion transparent to fluorescent radiation, and end walls, each of which comprises a window;

b. illuminating means disposed adjacent to a window at one end of said flow cell for passing a beam of radiation through said flow cell, said windows being transparent to the radiation emanating from said illuminating means;



c. monitoring means disposed adjacent to the window at the other end of said flow cell for detecting changes in the intensity of the radiation emerging from said flow cell, said illuminating means and said monitoring means being located on the longitudinal axis of said flow cell; and

d. fluorescence detector means, disposed relative to the transparent portion of the side wall of said flow cell for detecting fluorescent radiation emanating from within said flow cell.

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**3,920,335**

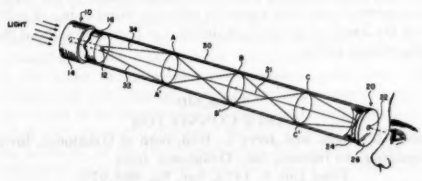
**OPTICAL COLLIMATION GAGE**

**Jack C. Seehase, 1200 Osceola Ave., Winter Park, Fla. 32789**

**Filed July 19, 1974, Ser. No. 490,130**

**Int. Cl.[2] G01B** *11/26*

**U.S. Cl. 356—138** **12 Claims**




**9.** An optical gaging device for visually determining the degree and location of misalignments of barrels of shotguns, rifles and similar devices comprising means mountable to one end of such barrel including means for producing an essentially point source of light at the approximate center of such barrel end, whereby such point source of light produces images consisting of a central point of light and a multiplicity of rings of light transverse to and along the inner surface of such barrel in combination with viewing means mountable to the opposite end of the barrel, said viewing means serving to guide the eye of a viewer to be accurately aligned with the center line of such barrel.

**3,920,336**

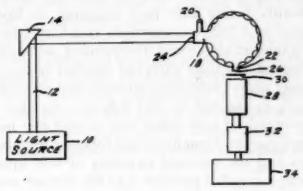
**SYSTEM FOR INTENSIFICATION OF WEAK ABSORPTION AND COLLECTION OF WEAK LIGHT EMISSION**

**Philip B. Sackett, Burlington, Mass., assignor to The United States of America as represented by the Secetary of the Air Force, Washington, D.C.**

**Filed May 21, 1974, Ser. No. 471,931**

**Int. Cl.[2] G01N** *21/24*

**U.S. Cl. 356—201** **12 Claims**




**1.** A system for monitoring and intensifying weak absorption and for collecting and studying weak light-emission comprising: a source of light; a cavity having its internal surface highly reflective; means for introducing and maintaining a material sample within the cavity; means for directing light into the cavity; means for introducing light into the cavity; means for removing light from the cavity, said means lying on an axis other than the light entrance axis; means associated with the cavity for filtering light exiting from the cavity; means for detecting light exiting the cavity; amplifier means connected to the means for detecting, and analysis means having a display connected to the amplifier means for providing an indication of the intensity of the absorption or emission within the cavity.

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**3,920,337**

**RETRACTABLE BALL POINT PEN**

**Walter C. Ganz, New York, N.Y., assignor to K. C. Pen Co., Inc., Brooklyn, N.Y.**

**Filed May 9, 1974, Ser. No. 468,559**

**Int. Cl.[2] B43K** *24/02*

**U.S. Cl. 401—106** **10 Claims**

**1.** A retractable writing implement comprising a barrel member, an elongated writing element disposed in said barrel member and longitudinally movable between a retracted position and an advanced position projecting through the bottom of said barrel member, spring means urging said writing ele-

ment toward its retracted position, a follower member longitudinally slidably disposed in the upper part of said barrel member and in engagement with the upper part of said writing element, said barrel member having a first opening therein registering with said follower member, and a clip member mounted on the upper part of said barrel for swinging about a transverse axis between the top and bottom of said clip member, said clip member including upper and lower arms extending above and below said axis, said clip member lower arm having a cam at its lower end registering with said first opening and provided with an inwardly upwardly inclined downwardly facing cam face engaging an upwardly facing portion of said follower member, said barrel having a second opening therein above said first opening, and said clip member including an inwardly directed bracket between said upper and lower arms projecting through said second opening and swingably connected to said follower member, whereby inward swinging of said lower arm of said clip member effects the downward movement of said follower member and writing element and the outward swinging of said upper arm to an outwardly extended position and the inward swinging of said upper arm from its extended position swings said lower arm outwardly and the raising of said follower and writing element.

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**3,920,338**

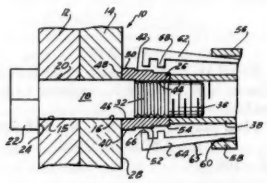
**FASTENER ASSEMBLY FOR PRELOADING A JOINT**

**Warren F. Dahl, Philadelphia, Pa., assignor to Standard Pressed Steel Co., Jenkintown, Pa.**

**Continuation-in-part of Ser. No. 285,906, Sept. 1, 1972, Pat. No. 3,803,793, which is a continuation of Ser. No. 28,377, April 14, 1970, abandoned. This application Mar. 26, 1973, Ser. No. 345,106The portion of the term of this patent subsequent to Apr. 16, 1991, has been disclaimed.**

**Int. Cl.[2] F16B** *7/00*

**U.S. Cl. 403—19** **9 Claims**



**1.** In a joint assembly including a plurality of adjacent workpieces having aligned openings therein, a preload fastening assembly comprising:

a fastener member having a head and shank portion extending through said openings,

said head engaging the outer surface of one of said workpieces,

said shank portion including a free end projecting beyond the free surface of another of said workpieces,

at least one portion of said projecting end of said shank portion provided with a segment having an irregular surface configuration to provide a locking surface and another portion of said projecting end of said shank portion adjacent said free end thereof having a configuration cooperating with a selectively reusable removably positioned abutment means for eliminating free play in said joint assembly prior to inducing the final preload therein, a deformable collar having one end disposed against the free surface of said another workpiece and its other end initially bearing on said abutment means, said collar further having an initially smooth surfaced internal bore surrounding said projecting end of said shank in the vicinity of said irregular surface configuration on said shank, said collar being deformed radially inwardly toward said shank portion at selected areas so that material of said collar extends radially inwardly into interlocking engagement with said irregular surface configuration on said shank portion and axially against both said free surface of said another of said workpieces and said abutment means thereby effecting an axial elongation of said collar and said shank and preloading said joint assembly, after assembly of said joint the interlocking engagement between said collar and said irregular surface configuration on said shank portion developing the only reaction force on said shank fixing the preload in said joint assembly.

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**3,920,339**

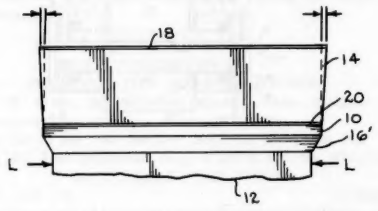
**STRAIN ARRESTOR PLATE FOR FUSED SILICA TILE**

**James C. Fletcher, Administrator of the National Aeronautics and Space Administration, with respect to an invention of, and Murat H. Kural, Sunnyvale, Calif.**

**Filed Nov. 28, 1973, Ser. No. 419,748**

**Int. Cl.[2] E06B** *9/26*

**U.S. Cl. 428—109** **8 Claims**



**1.** An improved joint between a high strength metal structural member having a relatively high thermal coefficient of expansion and an insulating tile member composed of chemically pure fused silica, the assembly being subject to temperatures ranging from −250° to 2300°F, said tile member having a thermal coefficient of expansion in the order of $3 \times 10^{-7}$ in/in/°F, said joint comprising a separate, thin layer of nonmetallic adhesive bond secured to the insulating member, a strain arrestor plate being the same size in plan as the tile secured to the adhesive bond, said adhesive bond being flexible or resilient at temperatures above its glass transition range and said strain arrestor plate having a high yield strength, high stiffness, a low coefficient of thermal expansion, approximately equal to that of the insulating member, and being of such a thickness that contractions of the structural member resulting from changes in temperatures are substantially absorbed by the plate, and a second, separate, thin layer of flexible nonmetallic adhesive bond securing the strain arrestor plate to the structural member, the thin layers of adhesive bond being of sufficient thickness to securely maintain the bond throughout the temperature range.

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**3,920,340**

**CABLE CONNECTOR**

**Robert D. Jones, and Jerry L. Hall, both of Oskaloosa, Iowa, assignors to Intraco, Inc., Oskaloosa, Iowa**

**Filed July 5, 1974, Ser. No. 485,977**

**Int. Cl.[2] F16B** *7/18*

**U.S. Cl. 403—306** **6 Claims**

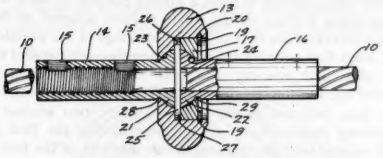
**1.** A connector for a cable comprising:

a first enlarged portion adapted to be connected to one end of a cable, said first enlarged portion having a partially spherical surface thereon;

a second enlarged portion adapted to be connected to one end of a cable, said second enlarged portion have a partially spherical surface thereon;

a connector body having a central bore therein, said connector body surrounding each enlarged portion and abutting said first enlarged portion, said connector body also having a counterbore therein, said central bore of said connector body having a partially spherical surface which

is complimentary in shape to the shape of the partially spherical surface of the first enlarged portion;




a washer disposed in said counterbore and abutting said second enlarged portion, said washer having a partially spherical surface which is complimentary to the partially spherical surface of said second enlarged portion; and

means for holding said washer in said counterbore.

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**3,920,341**

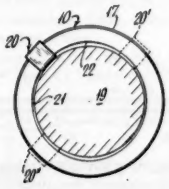
**LOCKING DEVICE FOR A BEARING RING OF THE LIKE**

**Franklin S. Atwater, New Britain; Horace B. Van Dorn, Kensington, and Sven V. Swanson, Hartford, all of Conn., assignors to Textron Inc., Providence, R.I.**

**Filed June 15, 1972, Ser. No. 263,273**

**Int. Cl.[2] F16D** *15/00*

**U.S. Cl. 403—352** **10 Claims**




**1.** In combination, a machine element including a ring component sized to fit a given cylindrical mounting profile, said ring component having an annular axially extending end portion projecting in axially offset relation to a body portion, said ring component being defined between inner and outer cylindrical surfaces, one of said surfaces being sized for fit to the given mounting profile, said one surface at said end being circumferentially continuously relieved for its full 360° circumferential extent, such relief being characterized over its arcuate extent by a continuous eccentricity which is arcuate in the same direction about a common center and which eccentricity continuously varies about said common center to the extent of an integer plurality of cycles of such variation for a full 360° about the ring axis, thereby defining a corresponding plurality of interlaced maximum and minimum reliefs at angularly spaced locations about the axis of said one surface, a locking component including a tongue of thickness intermediate the maximum and minimum reliefs, and engaged means coacting between said components for retaining an assembled relation of said tongue in one of the relieved regions of said ring component.

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**3,920,342**

**BEARING LOCKING DEVICE**

**Charles W. Warda, 46 Amidon Ave., Newington, Conn. 06111**

**Filed May 17, 1974, Ser. No. 470,969**

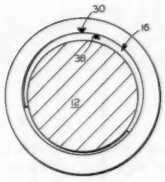
**Int. Cl.[2] F16B** *2/18*

**U.S. Cl. 403—352** **7 Claims**

**1.** A bearing locking device assembly operable for locking a bearing to a shaft comprising:

a. a bearing having a pair of end walls and a bore extending therethrough between said pair of end walls, said bore of said bearing having an enlarged portion of greater diameter extending inwardly from one end wall thereof and providing a generally radially extending shoulder in said bore spaced from but in close proximity to said one end wall, said radially extending shoulder being eccentric in shape with the width thereof varying from a maximum at one point therealong to a minimum at another point spaced therefrom, said enlarged portion of said bore being of greatest diameter at a point spaced inwardly from said one end wall; and

b. a locking shoe member of generally arcuate configuration seated fully within said enlarged portion of said bore, said shoe member having an inner surface curvilinear in shape having a radius corresponding in dimension to the radius of the main portion of said bore of said bearing and an outer surface curvilinear in shape having a radius generally corresponding in dimension to the radius of said




radially extending shoulder, said inner surface and said outer surface of said locking shoe member defining a thickness therebetween varying from a maximum dimension at one point greater than the minimum width of said shoulder to a minimum dimension at another point spaced therefrom, said locking shoe member having a configuration cooperating with that of said enlarged portion of in said bore of said bearing and an axial length not greater than that of said enlarged portion to enable said locking shoe member to be fully received within said enlarged portion of said bore and movable circumferentially therewithin between a first position relative thereto wherein there is clearance between its inner surface and the associated shaft for slidably mounting the bearing locking device assembly on a shaft and a second position relative thereto for locking said bearing to the shaft wherein said point of maximum thickness of said locking shoe is wedged tightly between the associated shaft and a section of the enlarged portion of said bore where said shoulder is of reduced width.

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**3,920,343**

**KEY-AND-KEYWAY COUPLING FOR TRANSMITTING TORQUE**

**Steven C. Blue; Mark T. Curtis, both of Paducah, Ky.; William C. Orthwein, Carbondale, and Daniel H. Stitt, Metropolis, both of Ill., assignors to The United States of America as represented by the United States Energy Research and Development Administration, Washington, D.C.**

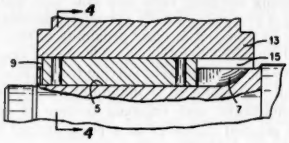
**Filed Nov. 13, 1974, Ser. No. 523,377**

**Int. Cl.[2] F16D** *1/08*

**U.S. Cl. 403—356** **10 Claims**

**1.** An assembly including first and second members coupled by a torque-transmitting key of generally rectangular cross section, at least one of said members having a longitudinally

extending keyway including a substantially straight ⊔-shaped key-seat, the bottom of said key-seat being merged with a




longitudinally arcuate ramp which as viewed in transverse section defines an outwardly concave arc.

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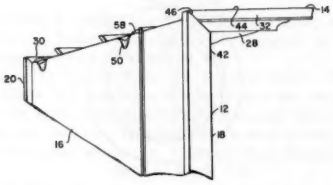
**3,920,344**
**MITER JOINT STRUCTURE**
**Richard N. Anderson, Owensboro, Ky., assignor to V. E. Anderson Mfg. Co., Owensboro, Ky.**
**Filed Mar. 12, 1973, Ser. No. 340,555**
**Int. Cl.[2] B25G** *3/36*; **E04G** *7/00*; **F16B** *7/18*
**U.S. Cl. 403—401** **7 Claims**




1. A pair of members joined at one end of each of them in a full miter joint, the one ends of which are completely miter cut so that the one ends abut each other over the entire surface of the one ends thereof in the miter joint when properly aligned, abutment means at the one end of one of the members extending in the direction of extent of the other of the members from the adjacent side of the one of the members abutting the adjacent side of the other member adjacent the one end thereof with the one ends of the members aligned in the miter joint, and fastening means extending transversely through the one end of the other member from the other side thereof and longitudinally into the one member and drawing the adjacent side of the other member tight against the abutment means at the one end of the one of the members to maintain a properly aligned, tight miter joint.

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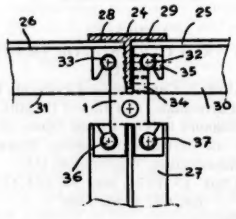
**3,920,345**
**T-SECTION ASSEMBLY CONNECTOR**
**Jean Stoltz, rue de l'Eglise, 77 Ury, France**
**Filed May 30, 1973, Ser. No. 365,097**
**Int. Cl.[2] B25G** *3/00*; **F16B** *2/02*; **F16D** *1/00*; **F16G** *11/00*
**U.S. Cl. 403—406** **6 Claims**




1. An assembly element, comprising a parallelepiped with respective pairs of first, second and third endfaces, two first slots, each first slot opening lengthwise into one of the first endfaces across at least a substantial portion of one dimension thereof, the first slots having a depth sufficient to receive and accommodate blade portions of a section piece adapted to be inserted therein, one of the first slots including a side surface shaped and adapted to form a mating portion to mate with a cooperating surface of the blade portion adapted to be inserted therein, four first threaded openings in the parallelepiped, each first opening extending therethrough parallel to the first slots and opening into both of the second endfaces thereof each of the openings being located between one of the first slots and one of the third endfaces, two second slots extending perpendicular to and intersecting the first slots, each second slot opening lengthwise into one of the first endfaces of the parallelpiped across the entire dimension thereof and into the third endfaces a distance corresponding to its depth, the second slots having a depth sufficient to receive and accommodate additional section pieces, two second threaded openings opening into one of the third endfaces and extending through the parallelepiped and opening into the surface of the first slot opposite the surface that includes the mating portion, the second openings being located on opposite sides of the second slot which intersects the first slot that includes the surface with the mating portion.

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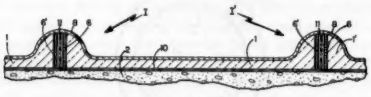
**3,920,346**
**APPARATUS FOR DIRECTION-INDICATING SURFACE MARKING AND THE LIKE**
**Charles W. Wyckoff, 85 Pine St., Needham, Mass. 02192**
**Filed Sept. 13, 1974, Ser. No. 505,620**
**Int. Cl.[2] G08G** *1/00*
**U.S. Cl. 404—14** **6 Claims**



1. A direction-indicating surface marker apparatus having, in combination, a continuous longitudinally extending strip having length and width many times its thickness and provided with integral successive longitudinally spaced transverse contiguous light-transparent upwardly and downwardly inclining wedges of somewhat saw-tooth configuration embedding substantially centrally within each wedge, an upwardly disposed substantially planar transverse retroreflective member; the upwardly and downwardly inclining surfaces of the wedge integrally protecting said member and enabling incident light passing through such surfaces to become retroreflected from said member, presenting a predetermined color indicative of direction, said strip having sufficient structural strength to permit it to be handled and secured to a roadway surface by adhesive.

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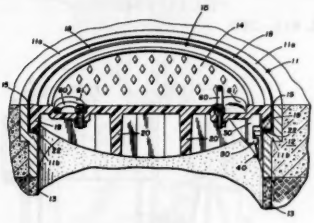
**3,920,347**
**MANHOLE COVER**
**John T. Sauriol, and Walter H. Gross, both of Dallas, Tex., assignors to Roby Industries, Inc., Dallas, Tex.**
**Filed Oct. 29, 1973, Ser. No. 410,491**
**Int. Cl.[2] E02D** *29/14*
**U.S. Cl. 404—25** **12 Claims**

1. Apparatus for closing the surface opening of a vertically extending passage to an underground installation, comprising:
a. closure support means for disposition within the ground and defined by an annular retaining ring circumscribing said surface access opening, and an annular flange having a top surface recessed a defined depth from the top surface of said retaining ring to provide a support ledge, and
b. closure means disposed within said surface access opening, said closure means comprising a top surface portion, a peripheral portion enclosing said top surface portion supported solely by the support ledge of said closure

support means, and a network of transversely intersecting ribs enclosed by said peripheral portion and contiguous with said top surface portion and said peripheral portion, said network of transversely intersecting ribs providing the principal structural support for said closure means, said network further comprising a first plurality of ribs extending to a depth greater than said defined depth



and a second plurality of ribs extending to a depth greater than said defined depth, said second plurality of ribs having ends integrally joined with said annular peripheral portion and respectively transversely intersecting and joined with said first plurality of ribs at locations along their length and equidistantly spaced from the center of said top surface portion.

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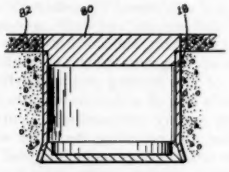
**3,920,348**

## TRAFFIC LANE INDICATOR

**Harry D. Paulos, Columbus, Ohio, assignor to Olympic Machine, Inc., Columbus, Ohio**

**Filed Sept. 9, 1974, Ser. No. 504,502**
**Int. Cl.[2] E01F** *9/00*
**U.S. Cl. 404—72** **3 Claims**



**3.** A method for reusing a traffic lane indicator after resurfacing a pavement, wherein the traffic lane indicator is of the type having an outer housing permanently anchored in the pavement, a sleeve removably mounted within said outer housing and a piston vertically, reciprocably mounted in said sleeve said method comprising:

a. removing said sleeve and said piston from said housing;
b. removably engaging a closure plug in said housing;
c. resurfacing said pavement;
d. removing said plug and the pavement immediately above said plug; and
e. mounting an extension sleeve and piston within said housing.

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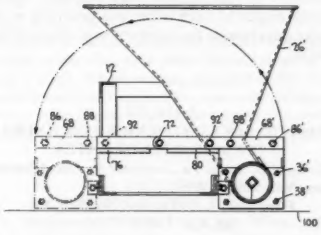
**3,920,349**

## CURB FORMING APPARATUS

**Charles E. Jennings, Jr., and John L. Kugle, both of Lancaster, Pa., assignors to Irl Daffin Associates, Inc., Lancaster, Pa.**

**Filed Dec. 2, 1974, Ser. No. 528,697**
**Int. Cl.[2] E01C** *19/52*
**U.S. Cl. 404—98** **8 Claims**

**1.** A curb forming apparatus comprising, in combination, elongated frame means having a longitudinally extending central axis, longitudinally spaced forward and rearward ends and laterally spaced sides; hopper means having an inlet for receiving a material from which the curb is to be formed, and an outlet; conveyor means including a rotatably supported elongated auger means, an elongated auger housing having a generally upwardly opening inlet and longitudinally spaced open ends, and a compaction tube having longitudinally spaced ends; releasable securing means for attaching said hopper means to said auger housing with said outlet of said hopper means communicating with said inlet of said auger housing; driving means for rotating said auger means including motor means carried by said frame means and power transfer means operatively connecting said motor means to said auger means; curb forming means having longitudinally spaced open ends and longitudinally extending, laterally spaced, lower edged; and front and rear roller means carrying said forward and rearward ends, respectively, of said frame



means and adapted for rollingly supporting said apparatus on a surface to be provided with a curb with said lower edges of said curb forming means juxtaposed to the surface; longitudinally spaced, laterally extending, elongated support arms, pivot means securing one end of each support arm to said frame means at about said central axis so that said support arms can be swung about said pivot means with portions of said support arms overhanging one or the other of said sides of said frame means, cleats on said frame means upon which said support arms rest; means for securing said auger housing; said auger means, said compaction tube and said curb forming means to each other in operable relationship to define an extrusion assembly, and means for securing said extrusion assembly to said overhanging portions of said support arms so that said apparatus can be operated to form a curb on either side of said frame means.

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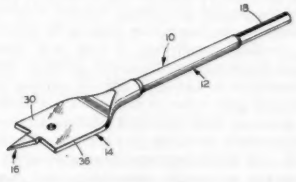
**3,920,350**

## SPADE BIT

**William Southall, deceased, late of Moonah, Australia (by Dorothy I. Southall, administratrix), assignor to The Stanley Works, New Britain, Conn.**

**Filed Feb. 11, 1974, Ser. No. 441,173**
**Int. Cl.[2] B23B** *51/00*; **B27G** *15/00*
**U.S. Cl. 408—211** **9 Claims**



**1.** A spade bit operable for drilling a workpiece comprising:

a. a shank;
b. a blade connected at one end to said shank having a pair of substantially flat faces and a pair of side edges extend-

ing along the sides of said pair of flat faces axially of said shank; and

c. a point element on the other end of said blade coaxially with said shank and having side edges diverging towards said side edges of said blade and a pair of faces converging to the tip thereof from the planes of said flat faces of said blade, said pair of side edges of said point element each being angularly disposed with respect to the planes of said pair of faces of said point element and extending parallel to each other so as to provide a generally rhomboidal transverse cross section for said point element, the leading edge portions of said blade extending from either side of said point element to said side edges of said blade being angularly disposed with respect to the planes of said pair of faces of said blade and inclined in the direction of said point element to locate the outer margins thereof on an imaginary line which intersects the point element, and the planes of said leasing edge portions extending at opposite angles to each other and generally in the same angular direction as the adjacent side edges of said point element.

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**3,920,351**

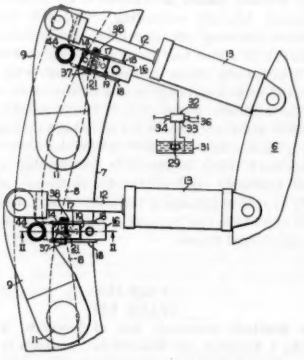
## AUTOMATIC LOCKING DEVICE FOR HYDRAULIC TURBINE WICKET GATES

**Robert G. Grubb, York, Pa., assignor to Allis-Chalmers Corporation, Milwaukee, Wis.**

**Filed Dec. 4, 1974, Ser. No. 529,351**

**Int. Cl.[2] F01D** *17/12*

**U.S. Cl. 415—163** **4 Claims**



**1.** In a hydraulic turbine having a plurality of wicket gates supported for pivotal movement between extreme open and closed positions, mechanism for locking the wicket gates in an extreme position comprising: a lever arm connected to a wicket gate for movement therewith; pressure fluid operating means connected to said lever arm for moving said lever and the connected gate between said open and closed gate positions; a pressure fluid operated plunger connected to said turbine selectively movable into and out of holding engagement with said lever arm; pressure fluid supply means; and control means selectively connecting said plunger to said pressure fluid supply means adapted to permit said plunger to move into said holding engagement position with said lever arm when said gates are in an extreme position and to permit said plunger to move out of said holding engagement position when said gates are in a position other than an extreme position.

**3,920,352**

## PUMP WITH PLASTIC HOUSING

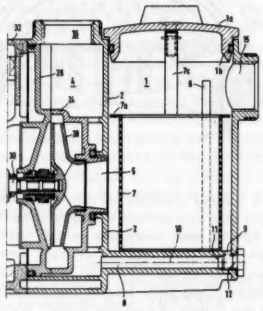
**Walter Speck, Heuberg, and Oskar Schmidt, Hilpolstein, both of Germany, assignors to Speck-Pumpen Daniel Speck & Soehne, Hilpoltstein, Germany**

**Filed Apr. 24, 1974, Ser. No. 463,661**

**Claims priority, application Germany, Apr. 26, 1973, 2321165**

**Int. Cl.[2] F04D** *29/44*

**U.S. Cl. 415—200** **10 Claims**



**1.** In a pump, a one-piece plastic housing having suction wall means defining a suction chamber, pressure wall means defining a pressure chamber, and separation wall means integral with said suction wall means and pressure wall means and separating said suction chamber from said pressure chamber, said separation wall means being formed with a suction opening through which said pressure chamber communicates with said suction chamber, said housing having a top and opposed sides, said suction wall means being formed with an opening at said top of said housing and defining a suction chamber which is free of undercuts, and said pressure wall means being formed with an opening situated at a location other than said opposed sides of said housing and also defining a pressure chamber which is free of undercuts, said suction wall means having an inner surface surrounding a central axis of said suction chamber and providing the latter with a predetermined cross-sectional configuration, and said separation wall means extending tangentially with respect to said suction wall means at a location where said separation wall means is integral with and intersects said suction wall means.

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**3,920,353**

## IMPELLER WHEEL FOR AN AXIAL FLOW FAN WITH ADJUSTABLE VANES

**Ole Jacobsen Bredsted, Naestved, Denmark, assignor to Nordisk Ventilator Co., A/S, Naestved, Denmark**

**Filed Jan. 23, 1974, Ser. No. 436,015**

**Claims priority, application Denmark, Jan. 23, 1973, 366/73**

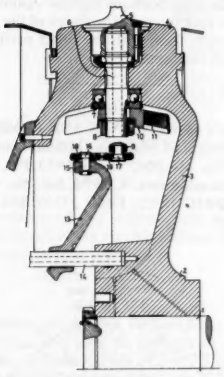
**Int. Cl.[2] F04D** *29/36*

**U.S. Cl. 416—168** **4 Claims**

**1.** An impeller wheel for an axial flow fan with adjustable vanes, where each vane has a pin which is rotatably accommodated in the hub rim of the fan wheel and within the said rim has an adjustment arm and an adjustment member for adjusting the pitch of the vanes which is common to all the vanes and is displaceable in the axial direction of the fan wheel, but is coupled to the wheel for rotation together with the latter; the improvements comprising:

a. a link rod connecting each adjustment arm with the adjustment member such that axial movement of said adjustment member changes the pitch of the adjustable vanes; and

b. two piece hemispherical bearing means interposed between said link rod and said adjustment member, and between said link rod and said adjustment arm oriented



such that the centrifugal force generated by rotation of the impeller wheel acting on the link rod retains the bearing pieces in contact with each other even when the highest possible adjustment force is being applied.

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**3,920,354**

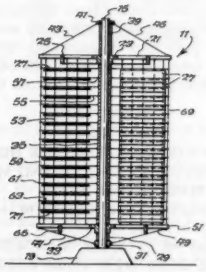
**HORIZONTAL HINGED-FLAP WINDMILL**

**Bert J. Decker, 136 Capen Blvd., Buffalo, N.Y. 14226**

**Filed Aug. 30, 1974, Ser. No. 501,968**

**Int. Cl.[2] F03D** *3/02*

**U.S. Cl. 416—117** **6 Claims**



**1.** A horizontal windmill which comprises a plurality of flaps or blades which move between feathered positions and operating positions, said flaps each being hinged at a side thereof and so located that when in operating position the flaps or blades overlap, with a side of one flap being pressed against the hinged portion of an adjacent flap, wire mounting means for the flaps on which the hinges are mounted and wire stop means for limiting the motion of the flaps when in feathered position, against which stop means the sides of such flaps bear, which sides are opposite to the sides bearing against the hinge portions of the adjacent flaps in operating position.

**3,920,355**

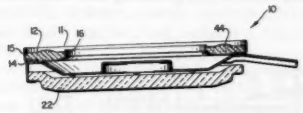
**GETTERING**

**Mario Zucchinelli, Milan, Italy, assignor to S.A.E.S. Getters S.p.A., Milan, Italy**

**Filed Mar. 1, 1974, Ser. No. 447,307**

**Int. Cl.[2] F04B** *37/02*; **F04F** *11/00*

**U.S. Cl. 417—49** **14 Claims**



**1.** A getter device for releasing an evaporable getter metal in a vacuum tube, said device comprising:

A. a ring,

B. a compressed, particulate getter metal releasing material attached to the ring, said getter metal releasing material having a zone of high density adjacent to the ring and a zone of lower density adjacent to the zone of high density; whereby upon release of the getter metal, the getter metal releasing material remains attached to the ring.

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**3,920,356**

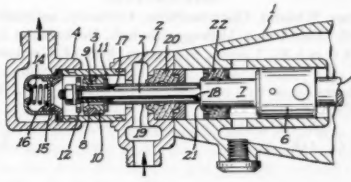
**RECIPROCATING PUMP**

**William L. Bruggeman, White Bear Lake, Minn., assignor to Cat Pumps Corporation, Minneapolis, Minn.**

**Filed Apr. 2, 1973, Ser. No. 346,726**

**Int. Cl.[2] F04B** *7/00*

**U.S. Cl. 417—511** **12 Claims**



**1.** A reciprocating pump to be operated by a source of mechanical power, comprising a pump cylinder having a liquid inlet and outlet, a piston rod to be driven by the source of power and extending into the cylinder, a piston on the end of said piston rod and confined within the cylinder for sliding movement within a predetermined length of stroke, a sleeve replaceably mounted concentrically on the piston rod for movement therewith, a first sealing element at the end of the cylinder and engaging and sealing against a portion of the sleeve with a length approximately the length of stroke, a second sealing element sealing against a portion of the sleeve externally of the cylinder and spaced from the first sealing element, the piston rod having a step changing the diameter of the rod and positioned at the exterior of the cylinder to prevent liquid from the cylinder from creeping along the piston rod to the source of power.

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**3,920,357**

**PUMPING APPARATUS**

**Eugene D. Taylor, Kenosha, Wis., assignor to J. I. Case Company, Racine, Wis.**

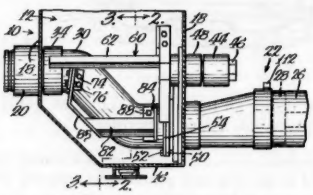
**Filed Mar. 13, 1974, Ser. No. 450,617**

**Int. Cl.[2] F04B** *15/02*

**U.S. Cl. 417—519** **6 Claims**

**3.** Pumping apparatus comprising: a hopper having a bottom wall and side walls for receiving a plastic mass, a delivery

line extending from said hopper, a pump cylinder having one end in communication with said hopper, said cylinder having a piston reciprocated therein, pump drive means for moving said piston in one direction to withdraw said plastic mass from said hopper into said cylinder and in an opposite direction to force said plastic mass from said cylinder, a valve in said hopper, said valve having one open end connected to said delivery line and an opposite open end, moving means connected to said valve for reciprocating said valve between two



positions, said valve connecting said cylinder to said delivery line in one position and placing said cylinder in communication with said hopper in the other position, and agitating mechanism carried by said valve and movable therewith for agitating the plastic mass and said valve is moved between said positions, said agitating mechanism including a blade secured to said valve and positioned at a location adjacent one of said side walls, said blade being adapted for agitating said plastic mass adjacent an upper edge of said hopper.

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**3,920,358**

**BUILT-UP ROTOR CONSTRUCTION FOR ROTARY MECHANISMS**

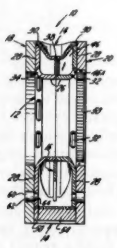
**Werner Wieland, Obereisesheim, Germany, assignor to Audi NSU Auto Union Aktiengesellschaft, Neckarsulm and Wankel G.m.b.H., Lindau, Bondensee, both of, Germany**

**Filed Oct. 25, 1974, Ser. No. 517,966**

**Claims priority, application Germany, Nov. 8, 1973, 2355738**

**Int. Cl.[2] F01C** *1/02*; **F04C** *17/02*; **B23P** *15/10*

**U.S. Cl. 418—61 A** **11 Claims**



**1.** A rotor having a plurality of component elements of cut and formed sheet metal material and bonded together into a unitary structure and disposed for eccentric rotation within a housing cavity partially defined by a trochoidal peripheral surface, the rotor comprising:

a. at least one element forming a bearing hub having axially spaced, radially extending flange portions;

b. two substantially congruent side wall elements disposed on opposite sides of the bearing hub and in abutment against said flange portions;

c. said bearing hub flange portions being dimensioned so that their outer peripheral edges thereof are spaced inwardly of the outer peripheral edges of the side wall elements; and

d. a plurality of flank elements each of which have inner and outer surfaces, opposite side edge portions and opposite end edge portions;

e. the flank elements being disposed with their said inner surfaces secured to the outer peripheral edge portions of said flange portions of the bearing hub and with their opposite side edge portions secured against said side wall elements so that the outer surfaces of the flank elements lie substantially flush with the outer peripheral edges of the side wall elements.

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**3,920,359**

**ROTARY ENGINES AND PUMPS**

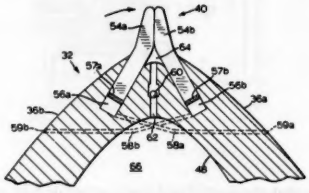
**Herbert Lewis Gray, 54 Main St., Milton, Ontario, Canada**

**Division of Ser. No. 414,000, Nov. 8, 1973, Pat. No. 3,884,600.**

**This application Oct. 9, 1974, Ser. No. 513,446**

**Int. Cl.[2] F01G** *19/02*; **F04C** *27/00*; **F01C** *21/04*

**U.S. Cl. 418—87** **5 Claims**



**1.** In a rotary mechanism comprising a body providing an internal chamber having an internal peripheral surface and a lobed rotor mounted within the chamber for rotation within the chamber with a plurality of circumferentially-spaced apex portions in sealing engagement with the said chamber internal surface, a seal for interposition between a respective apex portion and the chamber internal surface, each seal comprising two axially-extending abutting seal members mounted in respective axially-extending slots in the apex portion, each seal member being operative as a piston within its respective slot as a cylinder, means for supplying to the leading seal member operative fluid from the respective rotor trailing face, and for supplying to the trailing seal member operative fluid from the respective rotor leading face, the supply of fluid to each seal member urging the respective seal member radially outwardly from the rotor into engagement with the chamber internal surface and into engagement with the other seal member to oppose the fluid pressure thereon from the chamber.

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**3,920,360**

**ALUMINUM-IRON COMPOSITE ROTOR HOUSING FOR A ROTARY COMBUSTION ENGINE AND METHOD OF MAKING THE SAME**

**Carl A. Bierlein, Kettering, Ohio, assignor to General Motors Corporation, Detroit, Mich.**

**Filed May 30, 1974, Ser. No. 474,515**

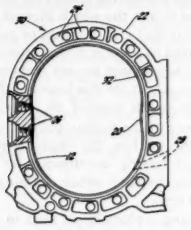
**Int. Cl.[2] F01C** *21/00*; **B23P** *15/00*; **B22D** *19/00*

**U.S. Cl. 418—178** **5 Claims**

**1.** A composite rotor housing member for a rotary engine of the type characterized by a rotor housing defining a closed peripheral surface, a side housing member on each side of said rotor housing, said rotor housing and side housing members cooperating to define a cavity in which a rotary piston is rotatably mounted in sealing engagement with said peripheral surface, a said rotor housing member comprising:

an aluminum or aluminum alloy die cast body portion having a ferrous metal liner on the inner surface of said body portion, said liner defining the configuration of a said peripheral surface of a said rotor cavity, and an intermediate sponge-like layer of copper brazed metal particles fused to each other and to said ferrous metal liner, said

metal being selected from the group consisting of iron and nickel, the aluminum body portion penetrating pores



between particles of said intermediate layer in a strong coextensive interlocking mechanical and heat conductive bond with said ferrous metal liner.

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**3,920,361**

**GEAR ARRANGEMENT FOR MAINTAINING CONTINUOUS CONTACT BETWEEN FLANKS OF A POWER ROTOR AND COOPERATING SEALING MEANS ON AN ABUTMENT MEMBER IN A ROTARY COMBUSTION ENGINE**

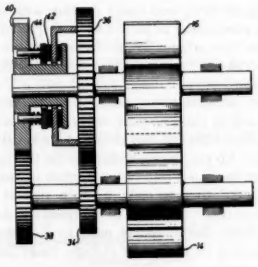
**Hans Robert Nilsson, Ektorp, Sweden, assignor to Svenska Rotor Maskiner Altiebolag, Nacka, Sweden**

**Filed Jan. 16, 1974, Ser. No. 433,751**

**Claims priority, application United Kingdom, Jan. 17, 1973, 2504/73**

**Int. Cl.² F01C** *1/08, 19/00*

**U.S. Cl. 418—191** **4 Claims**



**1.** In an internal combustion engine of the type comprising a grooved power rotor; a grooved rotary abutment member intermeshing with the power rotor; a power shaft nonrotatably connected with the power rotor; and said abutment member being subjected to a periodically varying torque which at least in one direction has a small amplitude from the zero torque value and carrying movable sealing means biased into contact with the flanks of the power rotor grooves;

means for maintaining continuous contact between flanks of the power rotor and cooperating sealing means carried by the abutment member, comprising:

a first pair of intermeshing gears nonrotatably connected with the power rotor and the rotary abutment member, respectively, and having exactly the same gear ratio as the intermeshing power rotor and abutment member;

a second pair of intermeshing gears; and

a friction clutch rotatably connecting one gear of said second pair of intermeshing gears with one of the power rotor and the abutment member;

the other gear of said second pair of intermeshing gears being nonrotatably connected with the other one of said power rotor and abutment member; said second pair of intermeshing gears having a gear ratio differing from that of said first pair of intermeshing gears so that the torque transmitted through said friction clutch is larger than said small amplitudes of the torque of the abutment member.

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**3,920,362**

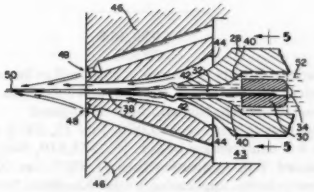
**FILAMENT FORMING APPARATUS WITH SWEEP FLUID CHANNEL SURROUNDING SPINNING NEEDLE**

**Rexford H. Bradt, Claypool, Ind., assignor to Albert L. Jeffers, Fort Wayne, Ind.**

**Division of Ser. No. 301,611, Oct. 27, 1972, abandoned, which is a continuation-in-part of Ser. No. 96,305, Dec. 9, 1970, abandoned. This application Feb. 11, 1974, Ser. No. 440,983**

**Int. Cl.² D01D** *5/02, 5/18*

**U.S. Cl. 425—72** **7 Claims**



**1.** An apparatus for making filaments of uniform diameter and free of beaded ends from a congealable liquid material comprising, in combination, a spinning element in the shape of an elongated needle having a longitudinal axis and an outer surface facing outwardly away from said axis and tapering inwardly in one axial direction of said spinning element to a spinning point, nozzle means for supplying congealable liquid material to substantially the entire outer surface of said spinning element at a region thereof which is axially spaced from said spinning point, wall means substantially surrounding the spinning element in radially spaced relation thereto and forming a channel surrounding and extending axially of said spinning element for the flow of sweep fluid in one axial direction along said spinning element and on beyond the spinning point in said one axial direction so that fluid impelled in said axial direction within the channel will cause the liquid material to flow around the spinning element to the spinning point, whereby the fluid will draw the liquid material from the spinning point as a filament and will convey the filament away from the spinning point while attenuating the filament.

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**3,920,363**

**DRAG TROWEL WITH COUNTERWEIGHT MEANS**

**Henry A. Nelson Holland, Houston, Tex., assignor to Raymond International, Inc., Houston, Tex.**

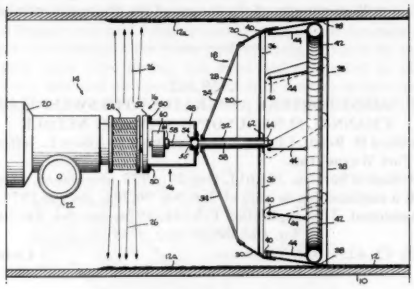
**Filed Mar. 11, 1974, Ser. No. 450,161**

**Int. Cl.² B28B** *21/94*

**U.S. Cl. 425—95** **28 Claims**

**1.** A drag trowelling device comprising a frame, trowelling leaves supported from said frame, an elongated lever arm, said frame being mounted at a first location on said lever arm, counterweight means to neutralize the net weight of the frame and trowelling leaves, said counterweight means being

mounted at a second location on said arm and support means including a pivot supporting said arm for swinging movement



about a third location intermediate said first and second locations.

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**3,920,364**

**PRESS**

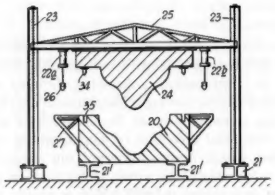
**Christopher Robert Johnston Cadogan-Rawlinson, Ex-Press Plastics Ltd., Harleston, Norfolk, and John Ross Kinley, The Manse, Wortwell, Norfolk, both of England**

**Continuation of Ser. No. 270,056, July 10, 1972, abandoned, which is a continuation of Ser. No. 877,810, Nov. 18, 1969, abandoned. This application June 21, 1973, Ser. No. 372,302**

**Claims priority, application United Kingdom, Nov. 19, 1968, 54927/68**

**Int. Cl.² B29C** *3/06*

**U.S. Cl. 425—135** **10 Claims**



**1.** A molding press comprising support frame means a pair of opposed press members vertically movable relative to each other with said supporting means for pressing and parting coaction, synchronously acting actuators for commonly effecting pressing and parting coaction of said press members, said actuators being individually spaced apart and independently disposed with respect to each other and arranged in balanced relationship to each other, and said actuators further being interposed substantially peripherally of said press members and arranged to individually operatively interconnect said press members in common directional internal force-bearing relation and collectively constitute a portion of the supporting frame which operatively interconnects said press members during pressing and parting coaction of said press members.

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**3,920,365**

**APPARATUS FOR MAKING POLYMERIC FILM**

**Richard D. MUles, Wilmington, Del., assignor to E. I. Du Pont de Nemours & Company, Wilmington, Del.**

**Division of Ser. No. 280,890, Aug. 15, 1972, Pat. No. 3,819,775. This application Jan. 10, 1974, Ser. No. 432,132**

**Int. Cl.² B29F** *3/08*

**U.S. Cl. 425—141** **1 Claim**

**1.** In an apparatus for making polymeric film comprising:

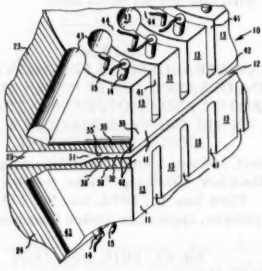
an extrusion die having a die body and die lips for continuously extruding molten polymeric material in flat polymeric film form;

film thickness measuring means for measuring the thickness of the film across the width thereof and adapted to transmit a signal that is a function of such thickness; and

means adapted to receive and to transmit such signal to film thickness adjustment means responsive to the signal and adapted to adjust the thickness of the film at any location across the width thereof by selectively controlling the temperature of the molten polymeric material as it moves through the die lips, the improvement including:

such die lips having continuous lip surfaces in opposed relationship to each other defining an extrusion orifice therebetween;

means defining a plurality of slots in such die lips with the slots next to each other defining a lip part therebetween, each of the slots being open throughout its length and



having an inner and outer portion with the inner portion being positioned adjacent to and spaced from such continuous lip surfaces of the die lips defining such extrusion orifice and the outer portion being positioned adjacent to such die body;

a heater element being positioned between each of such slots and in each lip part inwardly of such continuous lip surfaces of the die lips defining such extrusion orifice;

each such lip part being spaced from the lip parts next to it at both the inner and outer portion of each slot and being connected thereto only by thin ribs at such inner and outer portions whereby to thermally isolate each such lip part from the lip parts next to it and thereby control dissipation of heat into the die body and into other lip parts; and

wherein the outer portion of each slot has a substantially greater thickness that the rest of the slot whereby to serve as a heat dam to reduce heat flux into the die body.

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**3,920,366**

**EXTRUSION APPARATUS USING PERFORATED MEMBER IN DISCHARGE PASSAGE FOR PRODUCING SHEET MATERIAL WITH MULTICOLOR STRIATED PATTERN**

**Robert E. Randall, Kensington, Conn., assignor to Rowland, Incorporated, Kensington, Conn.**

**Filed Apr. 4, 1974, Ser. No. 457,770**

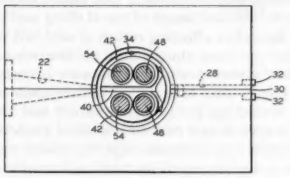
**Int. Cl.² B29F** *3/12*

**U.S. Cl. 425—131.1** **4 Claims**

**1.** An extrusion assembly for fabricating synthetic plastic sheet material having differentially colored bands with striations therein extending along the length thereof and comprising:

a. an extrusion die block having a chamber therein, an elongated extrusion orifice in one surface thereof and a discharge passage between the said chamber and said orifice;

b. a first feed conduit to said chamber at a point spaced to the opposite side thereof from said discharge passage for supplying a matrix of fluid synthetic thermoplastic resin;
c. at least one additional feed conduit to said chamber having a portion within said die member extending generally parallel to said extrusion orifice for supplying a differentially colored fluid synthetic thermoplastic resin;
d. at least one sleeve member within said chamber spaced from said discharge passage and extending generally parallel to said extrusion orifice, said sleeve member having a bore therein communicating with said additional feed conduit, said sleeve having a multiplicity of discharge openings communicating with said bore and opening adjacent said discharge passage; and




e. a perforated member in said discharge passage occupying the full depth of said passage and having a multiplicity of perforations therein, at least some of said perforations being closely spaced apart to provide narrow solid segments therebetween, whereby the composite stream passes through the perforations of said perforated member prior to discharge from said orifice and the differentially colored fluid synthetic plastic resin is caused to flow about the narrow solid segments between said perforations.

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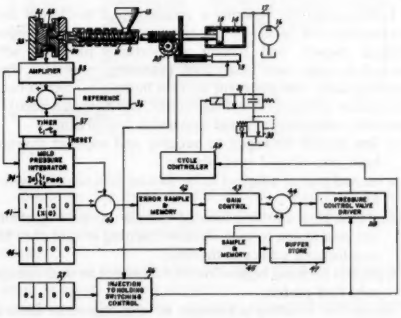
**3,920,367**
**MOLD PRESSURE CONTROL APPARATUS**
**Carlton Y. W. Ma, and Edwin Dean Ailman, both of Cincinnati, Ohio, assignors to Cincinnati Milacron Inc., Cincinnati, Ohio**
**Filed May 10, 1973, Ser. No. 358,839**
**Int. Cl.[2] B29F** *1/06*
**U.S. Cl. 425—149** **4 Claims**




1. A mold pressure control means for an injection molding machine having a mold with a cavity therein and a hydraulically operated ram for forcing a predetermined quantity of fluid plastic material into the mold cavity and holding it under pressure therein for a predetermined period during the molding cycle, said control means comprising a pressure transducer in the mold cavity for providing a signal representative of the pressure in the cavity, an integrating circuit including timing means for receiving the mold cavity pressure signal and integrating it over a predetermined time interval during the holding pressure portion of the molding cycle, a reference source for providing a signal representative of a desired mold pressure, means for comparing the signal from said integrating circuit with the signal from said reference source to produce a mold pressure error signal, means for storing the error signal for use in the next machine cycle, a source of hydraulic fluid under pressure for operating said ram, and means for modulating the pressure of said fluid in the next machine cycle in accordance with the stored error signal to thereby reduce the deviation of the mold pressure from the desired pressure.

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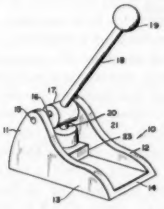
**3,920,368**
**TOY MOLDING PRESS**
**Jerome H. Lemelson, 85 Rector St., Metuchen, N.J. 08840**
**Filed Jan. 24, 1974, Ser. No. 436,074**
**Int. Cl.[2] B29C** *3/00*
**U.S. Cl. 425—195** **11 Claims**




1. A molding toy comprising:
a support,
a multiple part mold supported by said support and having an inlet for particulate molding material, said multiple parts of said mold including:
a first mold member having a bore defining a passageway therein,
a second mold member slidably supported within said bore defining said passageway of said first mold member,
a third mold member having a peripheral surface which is slidably supported by the wall of said bore in said first mold member for longitudinal movement of said third mold member within said passageway of said first mold member, said third mold member having a surface portion which is operable for cooperating with said second mold member in shaping molding material in said mold, means for retaining said second mold member at a first location within said passageway during a molding operation,
first actuating means including an arm pivotally supported by said support and adapted, when pivoted in one direction, to urge said third mold member to move longitudinally through said passageway toward said second mold member so as to decrease the distance between said second and third mold members and to compress and mold molding material disposed within said passageway into a defined shape, and
second actuating means associated with said second mold member and operable, when a force is applied thereto, to urge movement of a molded shape longitudinally through said passageway of said first mold member to effect removal of said molded shape from said passageway.

## 3,920,369
## MACHINE FOR THE PRODUCTION AND CLEANING OF EXPOSED AGGREGATE SLABS

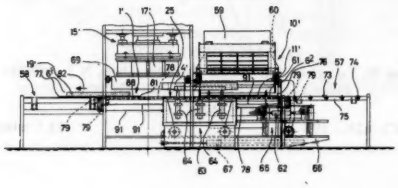
**Paul Boehringer, Oedheim, and Erwin Heiligenmann, Bad Rappenau, all of Germany, assignors to Boehringer & Co., Oedheim, Germany**

**Filed Dec. 15, 1972, Ser. No. 315,642**

**Claims priority, application Germany, Dec. 17, 1971, 2162850**

**Int. Cl.[2] B28B** *15/00*

**U.S. Cl. 425—253** **34 Claims**



**1.** In a machine for making exposed aggregate slabs of the type wherein at least the front side of each slab is formed by a layer of aggregate particles held together by a hardenable cementing agent, a combination comprising a form for reception of charges including particles of aggregate and cementing agent; a plurality of base plates, each including a top portion of elastomeric material; transporting means for moving said base plates along an endless path comprising a plurality of sections including a slab forming section where successive base plates register with and constitute the bottom wall of said form, and at least one second section; a conveyance for moving said form along said slab forming section and said transporting means including a drive which receives motion from said conveyance and which is arranged to move said base plates along said slab forming section and said second section of said path; means for feeding charges of cementing agent into said form and particles of aggregate onto that base plate which registers with said form so that the particles form a layer resting on the top portion of said registering base plate; compacting means including a press and agitating means actuatable to compact the charge in said form so that the charge is converted into a slab resting on said registering base plate; a supply of pallets; transfer means actuatable to transfer slabs from said base plates onto said pallets; and a cleaning unit arranged to clean the front sides of successive slabs on said pallets.

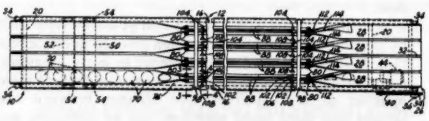
## 3,920,370
## APPARATUS FOR FOLDING AN EGG PRODUCT INTO AN OMELET

**Roland E. Miller, Orangeville, Ill., assignor to Kraftco Corporation, Glenview, Ill.**

**Filed July 16, 1973, Ser. No. 379,425**

**Int. Cl.[2] B29C** *17/00*

**U.S. Cl. 425—363** **9 Claims**



**1.** Apparatus for selectively folding an egg product from a generally flat pliable condition into an omelet configuration without creasing or fracturing the fold portion, said apparatus comprising, in combination, frame means, conveyor means including normally flat pliable belt means supported by said frame means and defining a predetermined path along with egg products are caused to travel during a folding operation, said conveyor means having a first end portion adapted to receive an egg product thereon in a generally flat pliable condition, drive means associated with said conveyor means and operative to effect motion of said belt along said path, and guide means cooperative with said conveyor means to maintain said belt means in a generally flat condition and effect movement of a pliable egg product received on said first end portion of said conveyor means along a first predetermined length of said path while in a generally flat condition, said guide means thereafter effecting upward folding of opposite longitudinal sides of said belt means while providing full surface support of said egg product to fold the egg product into a configuration wherein side portions thereof are in side-by-side relation and maintaining said folded condition for a second predetermined length of travel along said path, said guide means thereafter effecting return of said belt means to a generally flat condition along a third predetermined length of said path, and means positioned to cause only one side of the folded egg product to maintain surface contact with said belt means as said egg product passes from said second predetermined length of said path to said third predetermined length of said path and therewith urge the folded egg product to a position lying on one of its sides as it travels along said belt means after return of said belt means to said generally flat condition.

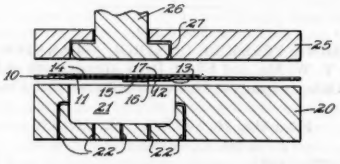
## 3,920,371
## APPARATUS FOR FORMING VISUAL DISPLAY PACKAGES

**Rudolph A. Faller, Edina, Minn., assignor to Hoerner Waldorf Corporation, St. Paul, Minn.**

**Filed Mar. 14, 1974, Ser. No. 451,019**

**Int. Cl.[2] B29C** *3/02*

**U.S. Cl. 425—388** **9 Claims**



**1.** Apparatus for forming a visual display container from a packaging card blank of the type having a window opening formed therein and having a rotatable platform section formed in said card blank and extending into said window opening area, said platform section being adapted to become an exterior portion of said container, and having a plastic film spanning said opening, said apparatus comprising:

a first platen arranged to receive and support thereon at least one of said card blanks;

a second platen adapted to be moved into registry with said first platen;

said first platen having formed therein an opening of similar size and shape to said window opening in said card blank, and located adjacent thereto;

a pocket forming region located adjacent to said opening in said first platen;

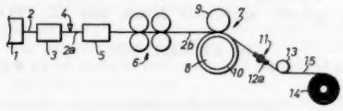
means for creating a vacuum in said region to form a recessed pocket in said plastic film to extend through said window opening in said card blank and said opening in said first platen, said recessed pocket in said plastic film generally conforming to said pocket forming region, and the movement of said plastic film rotating said platform section in said card blank into said pocket-forming region to become an exterior portion of said container; and

plug assist means for engaging a portion of said plastic film adjacent said platform section to move said portion and said platform section into said recessed pocket.

## 3,920,372
## APPARATUS FOR MANUFACTURING UNTWISTED SYNTHETIC RESIN STRING

**Fusao Katagi, Sakai, Japan, assignor to Katagi Goseikagaku Kabushiki Kaisha, Osaka, Japan**

**Filed Nov. 14, 1974, Ser. No. 523,914**
**Int. Cl.² B29C** *17/00, 25/00*
**U.S. Cl. 425—391** **10 Claims**



**8.** An apparatus for manufacturing an untwisted synthetic resin string comprising stretching means for stretching a strip of thermoplastic resin film at least longitudinally thereof, first guide means disposed to the rear of the stretching means and comprising a pair of rotatable members for nipping the stretched film strip on its front and rear surface widthwise thereof, second guide means disposed to the rear of the first guide means and located at a position deviated from the direction of straight advance of the film strip toward one side, and takeup means disposed to the rear of the second guide means, the second guide means comprising a looped member under heating conditions to melt the film strip, the looped member having an inner peripheral wall to gather the stretched film into a roll.

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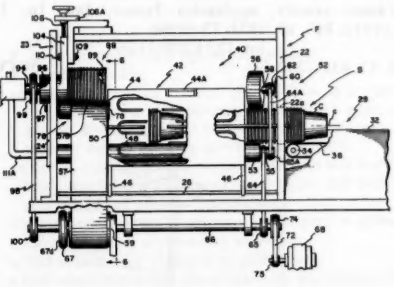
## 3,920,373
## LIP FOLDING APPARATUS

**Gaylord William Brown, Beaverton, Mich. 48612**

**Filed Sept. 16, 1974, Ser. No. 506,322**
**Int. Cl.² B29C** *17/02*; **B29D** *7/22*
**U.S. Cl. 425—392** **20 Claims**



**1.** Apparatus for forming deformable projecting rims or flanges provided on individual containers of a stack of nested containers or the like comprising:

a frame;

means on said frame for heating the rims to a deformable state at a rim heating station;

rim forming roller means, rotatably mounted on said frame about an axis, having spiral rim forming groove means for receiving and forming the heated rims therein at a rim forming station;

means for rotating said rim forming roller means; and

movable compressing belt means including at least a portion extending curvilinearly about and proximate to a peripheral portion of said forming roller means to receive said containers and traveling in a curvilinear path so as to peripherally engage said containers and maintain said rims in said groove means under such force as to effect conjoint rotation and relative axial movement of said containers and said rim forming roller means.

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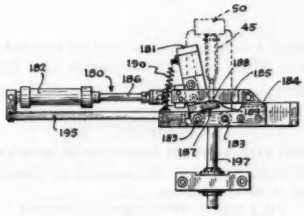
## 3,920,374
## APPARATUS FOR STRIPPING AND UNLOADING A MOLDED PART FROM A MOLD CORE

**Wilbert Redmer, Boca Raton; Kenneth Rolin, Del Ray Beach, and Herman Nittel, Boca Raton, all of Fla., assignors to Abbott Laboratories, North Chicago, Ill.**

**Division of Ser. No. 241,934, April 7, 1972. This application Dec. 13, 1974, Ser. No. 532,557**
**Int. Cl.² B29C** *7/00*
**U.S. Cl. 425—436 R** **2 Claims**



**1.** Apparatus for stripping and unloading a molded part from a mold core, said apparatus comprising:

a pair of opposed, pivoted jaws for gripping, stripping and releasing of the molded part from the core, one of said jaws having a bar connected thereto by a pivot, the other end of the bar being connected to means for drawing back and releasing the bar to thereby close and open the jaw, said bar having a curved depression in the bottom thereof;

the other of said jaws having a base plate at the bottom thereof projecting toward the opposite jaw, the projecting portion having a curved surface on the top thereof for mating with the curved depression in the bottom of the pivot bar so that as the pivoted bar is drawn back, the curved surface on the base plate of the jaw rides on the bottom surface of the pivoted bar to open the jaw when it rides in the curved depressison in the bottom of the bar and to close the jaw when it rides on the flat surface on the bottom of the bar to ultimately close the opposed jaws to engage the molded part so that the molded part is held firmly in the opposed jaws for removal of the part from the core, and to open the jaws when the bar is released after the part is removed from the core.

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## 3,920,375
## BURNER UNITS FOR GAS APPLIANCES

**Neville Edward Sanderson, and Bertram Benjamin Youngs, both of Lowestoft, England, assignors to British Domestic Appliances Limited, Petersborough, England**

**Filed Dec. 4, 1973, Ser. No. 421,611**
**Int. Cl.² F23H** *5/00*
**U.S. Cl. 431—78** **17 Claims**

**1.** A burner unit for a gas appliance comprising:

A. an enclosure,

B. a gas burner within the enclosure,

C. a gas inlet pipe extending through a wall of the enclosure to the burner,

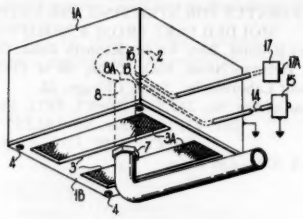
D. ignition means located within the enclosure and

i. operable from outside the enclosure to ignite the burner when gas is supplied thereto,

E. an air intake for admitting air into the enclosure

F. fine mesh means extending across the air intake and serving as a barrier which prevents the passage of a flame therethrough.

G. a flue extending upwardly in a gas tight manner from an opening in the top of the enclosure for carrying away burnt gases from the enclosure and



H. fine mesh means extending across the flue and serving as a barrier which prevents the passage of a flame therethrough.

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**3,920,376**

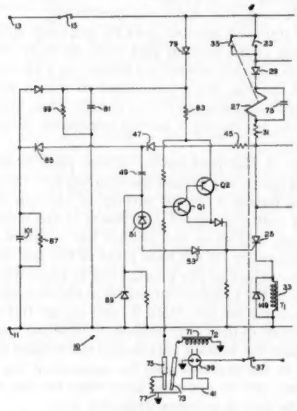
**CONTROL SYSTEM FOR A FUEL BURNER**

**Alvin D. Wyland, Morrison, Ill., assignor to General Electric Company, Fort Wayne, Ind.**

**Filed July 5, 1974, Ser. No. 486,004**

**Int. Cl.[2] F23H** *5/08*

**U.S. Cl. 431—79** **18 Claims**



1. An electrically energizable control system for a fuel burner comprising:

means for actuating a fuel valve to enable flow of a combustible fuel to the burner;

means for igniting the fuel emitted from the burner;

a first controlled switching device;

means for connecting the actuating means and the first controlled switching device to a source of electrical energy to effect energization of the actuating means when the first controlled switching device becomes conductive;

a second controlled switching device coupled to the first controlled switching device for rendering the first controlled switching device nonconducting when the second controlled switching device has been nonconducting for a predetermined length of time;

a third controlled switching device responsive to combustion of the fuel emitted from the burner for maintaining the second controlled switching device in its conducting state; and

the first controlled switching device including a relay having normally open contacts in series with the actuating means and the source of electrical energy, and an actuating coil in series with the second controlled switching device.

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**3,920,377**

**COMBUSTION APPARATUS**

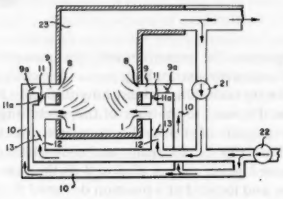
**Hiroshi Yanuki, Sagamihara, and Shigeru Miyao, Yokohama, both of Japan, assignors to Ishikawajima-Harima Jukogyo Kabushiki Kaisha, Tokyo, Japan**

**Filed June 28, 1974, Ser. No. 484,267**

**Claims priority, application Japan, July 12, 1973, 48-83159[U]**

**Int. Cl.[2] F23L** *7/00*

**U.S. Cl. 431—115** **8 Claims**



1. An improvement of a combustion apparatus comprising a plurality of burner ports, a plurlity of boiler tubes provided with fins, a plurality of slit-shaped air ports formed through the fins of the boiler tubes immediately above said burner ports, and a plurality of ducts connected to said air ports.

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**3,920,378**

**FLOATING BURNER APPARATUS FOR SUBMARINE PETROLEUM INSTALLATIONS**

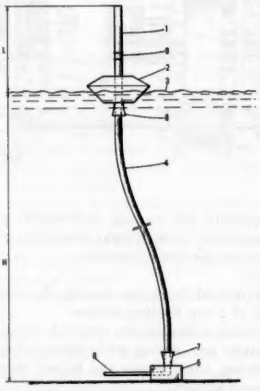
**André Castela, Mesnil Le Roi; Gilles Susbielles, Courbevoie, and Xuong Nguyen Duc, Rueil-Malmaison, all of France, assignors to Institut Francais du Petrole, Des Carburants et Lubrifiants, France**

**Filed Jan. 16, 1974, Ser. No. 433,653**

**Claims priority, application France, Jan. 16, 1973, 73.01512; Feb. 19, 1973, 73.05988**

**Int. Cl.[2] F23D** *13/20*

**U.S. Cl. 431—202** **34 Claims**



1. Floating burner apparatus for accommodating combustion of gas coming from a submarine petroleum installation, said apparatus comprising:

a flue for the combustion of said gas,

a buoy having a positive floatability, said flue being secured to said buoy with the upper end of said flue maintained

above the level of a body of water within which said buoy is floated, and

a principal fluid tight conduit serving simultaneously for anchoring said buoy and for transferring gas from the submarine petroleum installation to said flue, one end of said principal conduit being secured to said buoy and communicating with said flue, the other end of said principal conduit being connected to anchoring apparatus at the bottom of the body of water and communicating with the submarine petroleum installation,

wherein said principal conduit has a length at least equal to the distance separating the bottom and the surface of the body of water in such a manner that said buoy floats on the water surface, and

wherein said conduit is flexible so as to accommodate movement of said buoy in response to a drop in the level of the body of water within which said buoy is floated.

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**3,920,379**

## ASSEMBLY OF THE FLINT SPRING OF A GAS LIGHTER

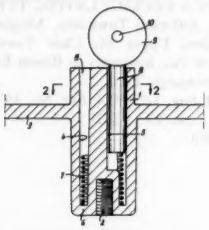
**Guy Neyret, Francheville, France, assignor to Etablissements Genoud & Cie Societe Anonyme, Venissieux, France**

**Filed Mar. 27, 1974, Ser. No. 455,319**

**Claims priority, application France, May 17, 1973, 73.18801**

**Int. Cl.[2] F23Q** *1/02*

**U.S. Cl. 431—276** **1 Claim**



**1.** A striker head for a lighter comprising:

a cylindrical body;

an axially extending circular groove formed in said body and defining a central core within said groove, said groove having a closed bottom within said body and an annular mouth opening at a surface thereof;

an axially extending bore having a diameter less than that of said circular groove formed in said core and intersecting said groove along one side thereof;

a compression spring positioned in said groove against said closed end and surrounding said core;

a flint in said bore engaged by said spring;

a flint wheel positioned above said bore and engaged by said flint, said wheel overlying only said one side of said mouth and leaving a segment thereof around the diametrically opposite side thereof exposed to receive a tool for compressing said spring; and

means on said cylindrical body for securing same to a lighter body.

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**3,920,380**

## METHOD AND FURNACE FOR HEAT TREATING MATERIAL

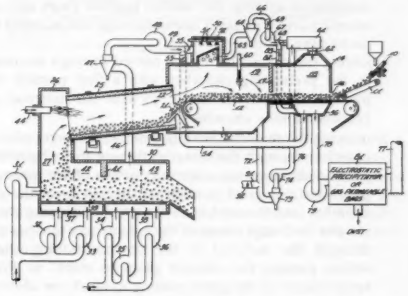
**Glenn A. Heian, Franklin, Wis., assignor to Allis-Chalmers Corporation, Milwaukee, Wis.**

**Filed Dec. 13, 1974, Ser. No. 532,632**

**Int. Cl.[2] F23J** *15/00;* **F27B** *7/02*

**U.S. Cl. 432—2** **10 Claims**

**1.** In a mineral furnacing apparatus having structure defining at least a chamber for preconditioning material having a material inlet opening, a chamber for preheating material, a chamber for final heating material having a material inlet opening adjacent the preheating chamber and having a material outlet opening and at least one cooling chamber having a material inlet opening adjacent the material output opening of the final heating chamber, the chambers being connected together in series flow arrangement to define a material flow stream from the preconditioning chamber to the preheating chamber, to the final heating chamber and thence to cooling chamber with the final heating chamber and the preheating chamber defining a passage for a counterflow of gas from the final heating chamber to the preheating chamber, and gas conveying means connecting said cooling chamber and said preheating chamber to said preconditioning chamber, said gas conveying means comprising:



A mixing box connected to the preheating chamber in which gases at a relatively high temperature are produced in position adjacent the material inlet passage of the final heating chamber and on a side of the material stream facing the flow of gas through the passage;

a first duct means connected on a first end thereof to said mixing box and connected on a second end thereof to said mixing box and connected on the a second end thereof preconditioning chamber;

a preheating chamber windbox operatively disposed below the material stream;

a second duct means connected on a first end thereof to the preheating chamber windbox and a second end thereof being connected to the preconditioning chamber at a location above the material stream;

a third duct means connected on a first end thereof to said mixing box and connected on a second end thereof to the cooling chamber; and,

moisturizing means connected to said mixing box to moisturize the gases in said mixing box;

whereby the gases from the preheat chamber are tempered with gases from the cooler chamber and said mixture of tempered gases are moisturized and directed to the preconditioning chamber as preconditioning gases at a controlled temperature for drying material in the preconditioning chamber and for controlling waste gas temperature and moisture content.

**8.** In a process for heat treating material in a material treating furnace arrangement in which a stream of material is progressed through a preconditioning chamber, a preheat chamber, a final heating chamber in which gases and volatilized alkalies are produced from the material therein and a cooler chamber in which gases from material being cooled are recouped and passed to the final heating chamber; comprising the steps of:

A. bypassing a first portion of the gases and volatilized alkalies produced in the final heating chamber away from the material in the preheat chamber;

B. tempering the first portion of the gases and volatilized alkalies with low temperature recouped gases from the cooler chamber;

C. mixing the first portion of the gases and volatilized alka-

lies from the final heating chamber with the low temperature gases from the cooling chamber;

D. moisturizing the mixture of gases of step C;

E. directing a portion of the moisturized gases to the preconditioning chamber;

F. drawing a second portion of the gases from the final heating chamber into contact with material in the preheating chamber;

G. drawing the second portion of gases from the final heating chamber that has contacted the material in the preheating chamber through the material;

H. admitting a supply of auxiliary heat into the preheating chamber and into contact with the second portion of the gases from the final heating chamber after the first portion of the gases from the final heating chamber has been directed away from the second portion gases and as the second portion of gas is drawn through the material in the preheating chamber;

I. joining the gases which have passed through the material in the preheating chamber with a first portion of the moisturized gases of step E to heat the material in the preconditioning chamber;

J. drawing the material heating gases in the preconditioning chamber through the material therein for exhausting the gas and also drawing a second portion of the moisturized gases and a second portion of the gas from the cooler chamber into the winbox of the preconditioning chamber to raise the temperature of the exhaust gas that has passed through the material in the preconditioning chamber before passing the exhaust gases to stack, so that the temperature of the gases passing to stack are above acid dew point and have a 10 percent or higher moisture content by volume.

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**3,920,381**

## ROTARY FURNACE HAVING A PLANETARY COOLER

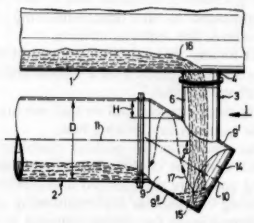
**Otto Heinemann, Ennigerloh, Germany, assignor to Polysius AG, Neubeckum, Germany**

**Filed Dec. 26, 1973, Ser. No. 428,459**

**Claims priority, application Germany, Feb. 1, 1973, 2304945**

**Int. Cl.[2] F27D** *15/02*

**U.S. Cl. 432—80** **11 Claims**



**1.** In a rotary tube furnace rotatable in one direction about an axis and having a material discharge end, the combination of a planetary cooler comprising a number of cooling tubes disposed in planetary manner about the periphery of said furnace with their longitudinal axes substantially parallel to the axis of rotation of said furnace; and duct means corresponding in number to the number of said cooling tubes and joining the discharge end of said furnace and each of said cooling tubes, each of said duct means comprising an inlet pipe and a head, closed at one end, said inlet pipe being joined at one of its ends to said furnace and at its other end to the closed end of said head, said head being joined at its other end to the associated cooling tube, said inlet pipe having a portion thereof inclined against the direction of rotation of said furnace, and said head having a substantially cylindrical portion inclined outwardly to the longitudinal axis of the associated cooling tube along a line extending from the juncture of said head and the associated tube to the juncture of said head and the associated inlet pipe, said portion extending a sufficient distance whereby material discharged from said furnace through any of said inlet pipes will form a cushion of material at the closed end of the associated head adjacent such inlet pipe.

**10.** A rotary tube furnace rotatable in one direction about an axis; a number of cooling tubes disposed in planetary manner about the periphery of said furnace with their longitudinal axes substantially parallel to the axis of rotation of said furnace; a head at one end of each of said cooling tubes and in communication therewith, each of said heads comprising a substantially cylindrical tube portion closed at one end and joined at its other end to the associated cooling tube and extending from said other end at an outward inclination to the axis of rotation of said furnace; and an inlet tube interconnecting and establishing communication between said furnace and each of said heads, said cylindrical tube portion of each of said heads extending a sufficient distance that material discharged from said furnace into such head via the associated inlet tube will form a cushion of material at the closed end of such head adjacent the associated inlet tube.

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**3,920,382**

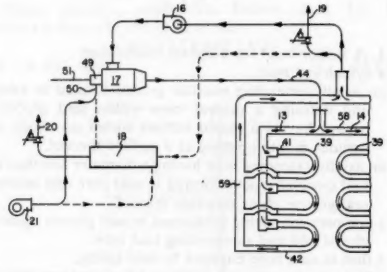
## METHOD AND APPARATUS FOR HEAT TREATING ARTICLES IN A RECIRCULATING TYPE FURNACE

**James E. Hovis, Jefferson Township, Allegheny County, and James E. Johns, Upper St. Clair Township, Allegheny County, both of Pa., assignors to Bloom Engineering Company, Inc., Pittsburgh, Pa.**

**Filed Aug. 14, 1974, Ser. No. 497,320**

**Int. Cl.[2] F27B** *5/14, 9/00*

**U.S. Cl. 432—209** **6 Claims**



**1.** A recirculating system suitable for a furnace for heat treating articles comprising:

A. a closed furnace chamber defined by at least one wall of refractory material;

B. positioning means within the furnace to position articles to be treated;

C. a pressurized system comprising hot gas lines positioned external to the furnace and adjacent the wall;

D. a heater including a combustion source connected between the pressurized system and the furnace chamber for providing hot gases and reheating recirculated products of combustion from the furnace chamber; and

E. nozzles extending between the hot gas lines and the interior of the furnace for communicating the hot gases and products of combustion from the lines into the furnace for treating the articles, the hot gases and products

of combustion entering the furnace chamber at a minimum velocity of about 100 ft./sec. which is sufficient to cause turbulence within the furnace to insure substantial uniformity in temperature within the furnace, said nozzles positioned away from and out of line with the positioning means so as to avoid direct hot gas impingement on said articles.

4. In combination, an external pressurized recirculating system connected to at least one radiant tube having an inlet leg and an exhaust leg, the recirculating system comprising a heater including a burner having an air inlet and a fuel inlet, a hot gas line placing the heater in communication with said inlet leg, an exhaust gas line communicating the exhaust leg with the heater for the recirculation of exhaust gases and circulation means associated with one of the hot gas or exhaust lines for causing circulation of the hot gases through the heater and the radiant tube.

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**3,920,383**

## FLUTED SURFACE HEAT EXCHANGER

**Elmer L. Kerr, Butler Twp., Columbiana County, Ohio, assignor to The Electric Furnace Company, Salem, Ohio**

**Filed June 20, 1974, Ser. No. 481,356**

**Int. Cl.[2] F24J** *3/00*

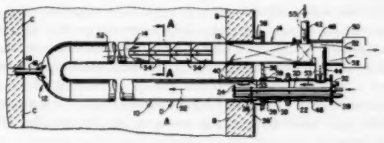
**U.S. Cl. 432—223** **38 Claims**

1. A heat exchanger comprising a fluted sheet conduit having straight axially extending, radially projecting, inside and outside fluteways formed with peaks and troughs therein, said inside fluteways being defined by the inside surface of said sheet and said outside fluteways being defined by the outside surface of said sheet,

a jacket tube within which said fluted sheet conduit may be slidably inserted,

an imperforate core tube connected in flow communication with said fluted sheet conduit,

means to flow a first fluid through said inside fluteways



between the outside surface of said imperforate core tube and the inside surface of said fluted sheet conduit, and

means to flow a second fluid through said outside fluteways between the inside surface of said jacket tube and the outside surface of said fluted sheet conduit, whereby there is a heat exchange between said first and second fluids.

# CHEMICAL

## 3,920,384
## AUTOXIDIZABLE HAIR DYE CONTAINING PREPARATIONS

**Raymond Feinland, Stamford, Conn.; Sigmund Iscowitz, Flushing, and Milos S. Bil, Forest Hills, both of N.Y., assignors to Clairol Incorporated, New York, N.Y.**

**Filed July 17, 1974, Ser. No. 489,317**

**Int. Cl.[2] A61K** *7/13*

**U.S. Cl. 8—10.2** **8 Claims**

1. An autoxidizable hair preparation capable of coloring hair when applied thereto and exposed to the atmosphere comprising an aqueous hair dye carrier and N,N-bis(2-hydroxyethyl)-p-phenylenediamine or an acid addition salt thereof and a triol selected from the group consisting of 1,2,4-benzenetriol and 2,4,5-trihydroxytoluene; said p-phenylenediamine and said triol being present in tinctorially effective amounts.

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## 3,920,385
## PROCESS FOR DYEING LEATHER

**Fritz Bohny, Basel; Willi Egli, Reinach, and Max Schwank, Basel, all of Switzerland, assignors to Ciba-Geigy AG, Basel, Switzerland**

**Continuation of Ser. No. 121,164, March 4, 1971, abandoned. This application May 3, 1973, Ser. No. 373,836**

**Claims priority, application Switzerland, Mar. 4, 1970, 3133/70; Jan. 15, 1971, 625/71**

**Int. Cl.[2] D06P** *3/32, 5/00, 3/12;* **C14C** *3/00*

**U.S. Cl. 8—12** **10 Claims**

1. In a process for dyeing leather by a single treatment of the leather with a dye liquor which is an organic-solvent solution of a dyestuff, expressing the liquor from the dyed leather immediately upon leaving the dye liquor, optionally fixing the dyestuff, and finally drying the dyed leather without prior washing, the improvement which consists essentially of continuously treating the leather, in the substantial absence of mechanical stress, at a temperature of 25° to 80°C, for a period of up to 15 seconds, with a liquor of a dyestuff dissolved in a combination of water and a watermiscible organic solvent selected from the group consisting of lower alkanol having 1 to 4 carbon atoms, ethylglycol, methoxyethyl alcohol, glycerol, acetone and tetrahydrofuran.

9. In a process for dyeing leather by a single treatment of the leather with a dye liquor which is an organic-solvent solution of a dyestuff, expressing the liquor from the dyed leather immediately upon leaving the dye liquor, optionally fixing the dyestuff, and finally drying the dyed leather without prior washing, the improvement which consists essentially of continuously treating the leather, in the substantial absence of mechanical stress, at a temperature of 25° to 80°C, for a period of up to 15 seconds, with a liquor of dyestuff dissolved in an organic solvent selected from the group consisting of acetone, ethanol, ether, petrol, benzene, chloroform, carbon disulphide, turpentine oil, carbon tetrachloride, trichloroethylene, ethyl acetate and butyl acetate.

## 3,920,386
## PROCESS FOR THE SINGLE-BATH DYEING OF CELLULOSE FIBERS OR MIXTURES THEREOF WITH SYNTHETIC FIBERS WITH WATER-INSOLUBLE AZO DYESTUFFS PRODUCED ON THE FIBER BY THE EXHAUSTION METHOD

**Egon Beyer, Niederhofheim, Hans-Ulrich von der Eltz, Frankfurt am Main, and Erich Schuster, Lammerspiel, all of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany**

**Filed Mar. 15, 1973, Ser. No. 341,363**

**Claims priority, application Germany, Mar. 18, 1972, 2213241**

**Int. Cl.[2] D06P** *3/83*

**U.S. Cl. 8—21 C** **3 Claims**

1. A process for the single-bath dyeing of cellulose fibers and mixtures thereof with polyester fibers, with water-insoluble azo dyestuffs produced on the fibers by the exhaust method, comprising the steps of: contacting a textile material containing the said fibers, at room temperature or moderately elevated temperature, with an aqueous dyebath containing, an alkaline substance, sodium nitrite, an anionic dispersing system comprising the sodium salt of 2,2′-dinaphthyl-methane-6,6′-disulfonic acid or lignin sulfonate in mixture with oleylmethyl taurine, a solution or dispersion of at least one compound capable of entering into azo coupling and at least one non-diazotized primary aromatic amine in a water-miscible organic solvent or solubilizer; after absorption of the coupling component upon the fibers, effecting diazotization of the said amine and formation of the dyestuff by coupling, by adding acid or acid salts to the dyebath at room temperature; and again contacting said fibers with said anionic dispersing system comprising the sodium salt of 2,2′-dinaphthyl-methane-6,6′-disulfonic acid or a mixture of lignin sulfonate with oleylmethyl taurine.

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## 3,920,387
## DINAPHTHYL DERIVATIVES, METHOD OF PRODUCING SAME AND APPLICATION THEREOF

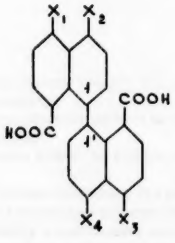
**Nikolai Stepanovich Dokunikhin, Presnensky val, 42, kv. 23, and Georgy Nikolaevich Vorozhtsov, Sadovaya-Spasskaya ulitsa, 21, kv. 268, both of Moscow, U.S.S.R.**

**Division of Ser. No. 246,521, April 24, 1972. This application Dec. 17, 1973, Ser. No. 425,545**

**Int. Cl.[2] C07D** *221/18;* **D06P** *1/22*

**U.S. Cl. 8—34** **1 Claim**

1. A method of dyeing textile materials, characterized in that textile materials are treated with an aqueous alkaline solution of a dinaphthyl derivative of the general formula




where $X_1$, $X_2$ and $X_3$, $X_4$ represent a group O=C—Y—C=O, wherein Y is an imino group, either unsubstituted or containing substituents: alkyl, cycloalkyl, aryl, heterocycle, either unsubstituted or containing substituents: amino group, halogen, alkoxy, alkyl; or one X of the pair $X_1$, $X_2$ and one X of

the pair $X_3$, $X_4$ represent a group —C=O, the other X then being in the benzimidazole or perinone cycle, said compounds being either symmetrical or non-symmetrical with respect to the 1,1'-bond, in the presence of reducing agents with subsequent oxidation, whereby perylenetetracarboxylic acid derivatives are formed directly on the textile material.

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3,920,388

## COMPOSITION FOR PREVENTING DETERIORATION OF HIDES FROM FRESHLY SLAUGHTERED ANIMALS

**Elmer Weaver, Spring Mount; William J. Hopkins, Philadelphia, and Alfred H. Korn, Maple Glen, all of Pa., assignors to The United States of America as represented by the Secretary of Agriculture, Washington, D.C.**

**Division of Ser. No. 275,988, July 28, 1972, Pat. No. 3,832,130. This application Apr. 23, 1974, Ser. No. 463,332**

**Int. Cl.² C14B** *1/02*

**U.S. Cl. 8—94.18** **6 Claims**

1. A synergistic composition for treating hides from freshly slaughtered animals to prevent said hides from deteriorating comprising the following components in the stated amounts based on the weight of the hide: about from 10% to 100% water, about 1.0% to 2.0% acidic component selected from the group consisting of acetic acid, propionic acid, and sodium acid sulfate, about 0.03% nonionic surfactant, and about 0.2% N,N'-bis(methoxy)methyl uron.

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3,920,389

## TEXTILE CLEANING PROCESS

**Albert Robert Eanzel, Wilmington, Del., assignor to E. I. Du Pont de Nemours & Company, Wilmington, Del.**

**Continuation-in-part of Ser. No. 328,382, Jan. 31, 1973, Pat. No. 3,854,871. This application Apr. 13, 1973, Ser. No. 350,796**

**Int. Cl.² B32B** *27/04*; **B44D** *1/09*

**U.S. Cl. 8—142** **2 Claims**

1. A process for simultaneous cleaning and finishing soiled textile materials in which the textile is

A. agitated in a vessel with a composition consisting essentially of

a major amount of a textile dry cleaning solvent; and

dispersed therein a polyfluoroalkyl-substituted stain repellent in an amount sufficient to give add-on of 0.05 to 0.5 percent, based on the dry weight of textile, and then

B. the treated material is dried.

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3,920,390

## MANUFACTURE OF FINISHING AGENTS FOR CELLULOSIC TEXTILES

**Harro Petersen, Frankenthal; Klaus Erhardt, Leimen; Wilhelm Ruemens, and Heinz Bille, both of Limburgerhof, all of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen (Rhine), Germany**

**Filed Sept. 26, 1973, Ser. No. 400,720**

**Claims priority, application Germany, Oct. 7, 1972, 2249320**

**Int. Cl.² C08G** *9/10*

**U.S. Cl. 8—185** **10 Claims**

1. A process for the manufacture of a liquid finishing agent for cellulosic textiles which is stable on storage, wherein a reaction mixture obtainable by reaction or urea or methylolated urea or a water-soluble urea-formaldehyde polycondensation product with formaldehyde in an overall molar ratio of urea: formaldehyde of from 1:3 to 1:10 in aqueous solution at a pH of from 0 to 3 is adjusted to a pH of from 6 to 10 and urea is added at a temperature of from 20° for 80°C to provide an overall molar ratio of urea to formaldehyde of from 1:1.5 to 1:2.5.

3,920,391

## FLAME-RETARDANT TEXTILES BY REACTION OF CELLULOSE WITH THE ADDUCT OF PHOSPHORUS TRICHLORIDE AND N,N-DIMETHYLFORMAMIDE

**Tyrone L. Vigo, Kenner; Clark M. Welch, Metairie, both of La., and Anna M. Collins, College Park, Ga., assignors to The United States of America as represented by the Secretary of Agriculture, Washington, D.C.**

**Filed Jan. 28, 1974, Ser. No. 437,096**

**Int. Cl.² D06M** *13/46*

**U.S. Cl. 8—188** **8 Claims**

1. A process for preparing a fibrous crosslinked N,N-dimethylorthoformamoylphosphorochloridite ester of cellulose in textile form, which ester is characterized by its containing nitrogen, phosphorus, and chlorine in a 1:1:1 atomic ratio, said process comprising:

a. immersion of a fibrous cellulose textile in N,N-dimethylformamide at a temperature of about from 20°C to 30°C for a period of from 1 minute to 60 minutes to swell the fibers,

b. removal of excess N,N-dimethylformamide from the swollen cellulose,

c. immersion of the cellulosic textile in a solution containing about from 1% to 30% by weight of the 1:2 adduct of phosphorus trichloride with N,N-dimethylformamide, in a solvent containing 50%–100% N,N-dimethylformamide together with an inert aprotic diluent selected from the class consisting of chloroform, methylene chloride, carbon tetrachloride and perchloroethylene, at a temperature of from 20°C to 60°C for about from 1 minute to 180 minutes, in order to obtain reaction of the cellulose with the aforesaid adduct,

d. washing the cellulosic textile with N,N-dimethylformamide to remove unreacted adduct,

e. washing the cellulosic textile with a solvent selected from the group consisting of benzene and chloroform, to remove the N,N-dimethylformamide, and

f. drying the textile.

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3,920,392

## METHOD FOR INHIBITING CORROSION OF METAL USING POLYSULFONE COMPOUNDS

**Susumu Harada; Masami Haruta, and Tadashi Kato, all of Koriyama, Japan, assignors to Nitto Boseki Co., Ltd., Fukushima, Japan**

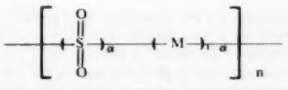
**Filed Jan. 24, 1973, Ser. No. 326,290**

**Claims priority, application Japan, July 26, 1972, 47-74747**

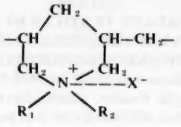
**Int. Cl.² C23F** *11/00*, *11/04*, *11/10*, *11/16*

**U.S. Cl. 21—2.5 R** **6 Claims**

1. A method for inhibiting the corrosion of a metal which comprises adding to a corrosive medium with which the metal comes into contact a corrosion-inhibitorily effective amount of a metal corrosion inhibitor represented by the general formula

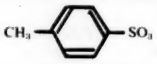


wherein M is one member selected from the group consisting of

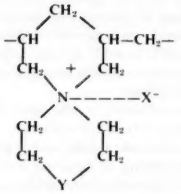


(I)

wherein $R_1$ and $R_2$, which may be the same or different, are hydrogen, straight or branched chain alkyls having 1 to 18 carbon atoms, aryls having 6 to 24 carbon atoms, aralkyls having 7 to 25 carbon atoms, carboxymethyl, carboxyethyl, cyanomethyl, 2-cyanoethyl, 2-sulfoethyl, sulfopropyl, 2-hydroxyethyl, 3-chloro-2-hydroxypropyl, allyl, propargyl or α- or β-naphthomethyl; and X is Cl, Br, I, HCOO, $CH_3COO$, $H_2PO_4$, $HSO_4$, $HSO_3$, $CH_3SO_4$,



or $HOCH_2COO$, and



(II)

wherein X is the same as defined above and Y is $CH_2$ or O; α is an average molar fraction of the $SO_2$ component in the general formula and ranges from 0.1 to 0.5; and *n* is a degree of polymerization.

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**3,920,393**

**INJECTION MEANS**

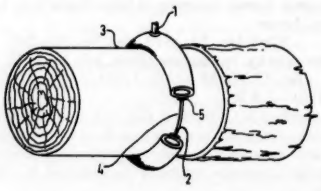
**Frederick Baynes, Bowden, and David Edward Bowker, Manchester, both of England, assignors to Dunlop Limited, London, England**

**Filed Nov. 27, 1973, Ser. No. 419,252**

**Claims priority, application United Kingdom, Nov. 28, 1972, 54833/72**

**Int. Cl. B27k** *3/08, 3/10, 3/14*

**U.S. Cl. 21—7** **11 Claims**



1. An apparatus for the introduction of preservative liquids into the trunk of a tree which comprises a closed flexible conduit to encircle the trunk of the tree, said conduit having an inlet for connection to pumping means for said liquid and an outlet for engagement, when encircling the trunk of a tree, with an incision in the trunk of the tree, said conduit being sufficiently flexible so that when it encircles the trunk of the tree it effects a seal between itself and said incision by pressure of the liquid being pumped through it.

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**3,920,394**

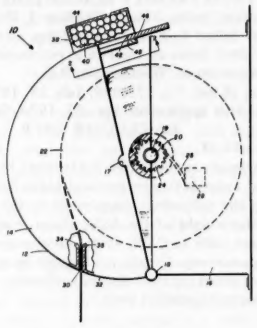
**TISSUE STERILIZING APPARATUS**

**Ernest John Marrapodi, 4930 Space Coast Parkway, Kissimmee, Fla. 32741**

**Filed Jan. 7, 1974, Ser. No. 431,217**

**Int. Cl.[2] A61L** *3/00, 9/04, 13/02*

**U.S. Cl. 21—76** **4 Claims**



1. Tissue sterilizing apparatus comprising:

a container for storing tissue therein, said container including two sections hingedly joined together;

means for suspending a roll of tissue in said container;

an enclosure communicating with said container;

a source of a sterilizing gas within said enclosure;

means interposed between said enclosure and said container for selectively preventing entry of said gas into said container said means for preventing entry of said gas into said container comprising, said container having a plurality of slots therein; said enclosure having an opening communicating with said slots; a slidable plate positioned across said opening and having slots therein corresponding to said slots in said container so that sliding of said plate back and forth selectively causes alignment of misalignment of said slots in said container and said slots in said plate thereby respectively permitting or preventing entry of said gas into said container;

means for dispensing tissue from said container, said dispensing means comprising

said container having a wall portion remote from said sterilizing source, said wall portion having a slot therein, and tissue receiving lips extending inwardly normal to said wall portion at said slot;

whereby said plate slots may be moved into misalignment with said container slots to prevent entry of said gas into said container during periods when said dispensing means is not in use.

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**3,920,395**

**DUAL TEMPERATURE CONCENTRATION SYSTEM**

**Jerome S. Spevack, New Rochelle, N.Y., assignor to Deuterium Corporation, White Plains, N.Y.**

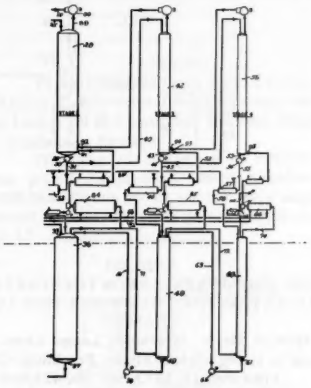
**Continuation of Ser. No. 822,974, June 25, 1959, abandoned, which is a division of Ser. No. 188,925, Sept. 29, 1950, Pat. No. 2,895,803. This application Sept. 26, 1966, Ser. No. 587,363**

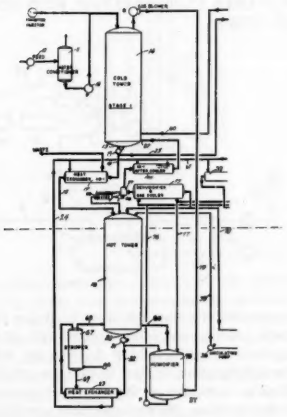
**Int. Cl. C01b** *4/00*

**U.S. Cl. 423—580** **15 Claims**

1. In a method of producing a product substance containing concentrated therein an isotope of an element by exchanging, at two different temperatures, said isotope with another isotope of the same element between chemically different first and second fluid substances which are physically separable from each other and which are each capable of containing

each of said isotopes, said method being of the type in which
a. a liquid feed stream of said first fluid is passed in a flow through each of the first and second units, in that order, of a pair of exchange units and thence to a point of disposal,
b. a gas stream of said second fluid is passed in a flow through each of the second and first units of said pair, in that order, and recirculated to pass therethrough again and again as a closed circulation,
c. said flows are passed through said units in counter-current and are contacted in each of the units of said pair to cause an exchange of isotopes of the element between said first and second fluids,
d. said first and second units are maintained at different temperatures such as to cause said feed-to-disposal stream of said first fluid to become enriched with respect





to said isotope in passing through said first unit and to become impoverished with respect to said isotope in passing through said second unit to a point of disposal, while causing said flow of second fluid to become enriched with respect to said isotope in passing through said second unit and to become impoverished with respect to said isotope in passing through said first unit,
said method being particularly characterized by the steps of
e. dividing into two flows the enriched stream of said closed circulation of second fluid passing from said second unit to said first unit,
f. delivering to said first unit one of the divided flows of said circulation referred to in step (e), and
g. passing the other of the divided flows of said circulation referred to in step (e) through a subsequent product producing isotope concentration treatment before delivering it to said first unit.

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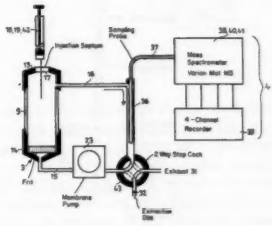
**3,920,396**

## METHOD AND DEVICE FOR DETERMINATION OF GASES DISSOLVED IN A LIQUID ESPECIALLY IN BLOOD

**Klaus Dieter Schuy, Heidestrasse 1 b, D-4618 Kamen-Methler, Germany**

**Filed Mar. 8, 1973, Ser. No. 339,111**
**Claims priority, application Germany, Mar. 8, 1972, 2211032**
**Int. Cl. G01n** *21/00, 31/00, 33/16*
**U.S. Cl. 23—230 B** **11 Claims**




1. In a method to determine the partial pressures or concentrations of gases dissolved in a liquid, and especially in blood, employing a loop extraction system for eliminating gases initially present in the system by washing-out the gases by an extraction gas, followed by the insertion of a predetermined amount of said liquid into an extraction chamber of said extraction system, in order to extract the said dissolved gases by said extraction gas, and subject the gas mixture arising from the extraction step to an analysis procedure using spectroscopic detection means, the improvement comprising:
after termination of the wash-out step, closing the extraction system,
inserting the liquid sample into the extraction chamber of the closed extraction system,
forcibly circulating the extraction gas through the liquid sample until there is thermodynamic equilibrium between all gases dissolved in the liquid sample and the mixture of gases in the gas space of the extraction chamber,
sampling a part of the circulated gases,
and transmitting the sampled part to said spectroscopic detection means whereby the gaseous mixture available in the gas space after establishment of equilibrium and with the extraction system still closed is analysed.

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**3,920,397**

## APPARATUS AND METHOD FOR QUANTITATIVE ANALYSIS OF IONIC SPECIES BY LIQUID COLUMN CHROMATOGRAPHY

**Hamish Small, Midland, Mich., and William C. Bauman, Lake Jackson, Tex., assignors to The Dow Chemical Company, Midland, Mich.**

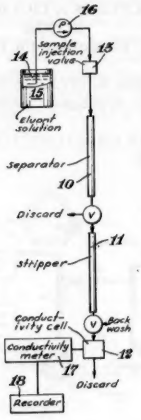
**Filed Aug. 6, 1973, Ser. No. 386,260**
**Int. Cl.[2] G01N** *31/04, 27/08*
**U.S. Cl. 23—230 R** **58 Claims**

1. Apparatus for chromatographic quantitative analysis of a plurality of ionic species in a solution, each species being of a common valence sign, said sign being one of positive or negative, which comprises:
first ion exchange resin bed means for chromatographically separating said plurality of ionic species on being added

to and eluted from such resin bed with solution of developing reagent;

means for adding said plurality of ionic species in solution to the first ion exchange resin bed means;

means for adding solution of developing reagent to the first ion exchange resin bed means;




second ion exchange resin bed means for receiving the separated ion species in the solution of developing reagent and converting all of said developing reagent to weakly ionized form while maintaining the ion species separated as said solution passes through and out of said second resin bed;

and a common means for quantitatively detecting each separated ion species of interest exiting from said second ion exchange resin bed means.

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**3,920,398**

## METHOD FOR CHROMATOGRAPHIC ANALYSIS OF ORGANIC ACIDS OR THEIR CARBOXYLATE SALTS

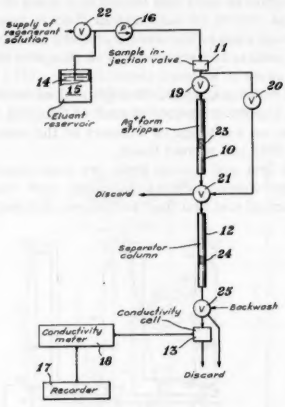
**Hamish Small, and Timothy S. Stevens, both of Midland, Mich., assignors to The Dow Chemical Company, Midland, Mich.**

**Filed Aug. 6, 1973, Ser. No. 386,264**
**Int. Cl.[2] G01N** *27/08, 31/04, 31/08*
**U.S. Cl. 23—230 R** **7 Claims**

1. The method of chromatographic quantitative analysis of a plurality of organic carboxylic acids or the carboxylate salts thereof present in aqueous sample solution substantially free ionic species other than said organic acids or salts thereof, water soluble metal halide, soluble metal hydroxide, or strong mineral acid, which comprises:

adding a predetermined amount of said sample solution to a cation exchange resin bed means, said means being charged with a cation exchange resin in the silver form, and eluting said sample from said first cation exchange resin bed means with water thereby precipitating the halides present as silver halide and capturing, at the ion exchange sites, any countervalent soluble metal ions, and hydronium ions, passing the effluent from the first cation exchange resin bed means through a second cation exchange resin bed means, said second resin bed means being charged with a cation exchange resin in the acid form thereby bringing about chromatographic separation of the organic carboxylic acids or the respective carboxylic acids produced from said carboxylate salts;

and passing the effluent from second cation exchange resin bed means containing substantially only aqueous of carboxylic acids and any strong mineral acid through a conductivity cell having associated readout means.

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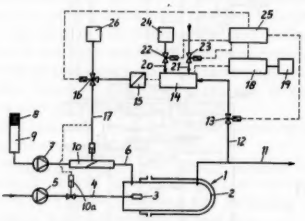
**3,920,399**

## PROCESS AND APPARATUS FOR THE START-UP OF AN INSTALLATION FOR THE PRODUCTION OF INERT GASES

**Georg Michael Meyer, Meerbusch Langst-Kierst, Germany, assignor to Georg Michael Meyer, Brookfield, Conn.**

**Filed Dec. 11, 1973, Ser. No. 423,666**
**Claims priority, application Germany, Jan. 19, 1973, 2302719**
**Int. Cl.[2] G01N** *27/00;* **B01J** *7/00;* **F23N** *5/24, 1/00*
**U.S. Cl. 23—230 A** **2 Claims**




1. A process for the start-up of an inert gas producing device in which a fuel is completely burned with air and wherein, during regular operation which follows an initial start-up period, the supply of air or fuel to said gas producing device is controlled in response to the inert gas composition measured by a gas analyzer, the improvement comprising the steps of controlling the air or fuel supply to said inert gas producing device during said initial start-up period according to a set point, automatically and separately calibrating said analyzer during said start-up period, said step of automatically calibrating said analyzer during said start-up period comprising passing air through said analyzer for calibrating the maximum oxygen content and passing an oxygen-free inert gas through said analyzer for calibrating the minimum oxygen content, and then controlling said air or fuel supply by said analyzer, which has just been calibrated, after completion of said start-up period to provide for control of said air or fuel supply by said calibrated analyzer during said regular operation in place of said set point control.

## 3,920,400
## URIC ACID STANDARD SOLUTION

**Peter Scheibe; Erich Bernt, both of Munich, and Wolfgang Gruber, Tutzing, Upper Bavaria, all of Germany, assignors to Boehringer Mannheim GmbH, Mannheim-Waldhof, Germany**

**Filed Feb. 5, 1974, Ser. No. 439,819**

**Claims priority, application Germany, Feb. 13, 1973, 2307052**

**Int. Cl.[2] G01N** *31/06*; **C09K** *15/20, 15/12, 15/06*

**U.S. Cl. 23—230 B** **17 Claims**

1. Uric acid standard composition comprising an aqueous, buffered solution of uric acid in the form of the lithium salt with a pH value between 6 and 8 and at least one complexing agent for the higher valence stage of polyvalent heavy metal ions.

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## 3,920,401
## FLAME IONISATION DETECTORS

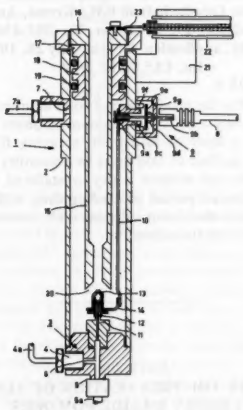
**John William Gatiss; Peter Leonard Joynes, and Romuald-Jerzy Liszka, all of Cambridge, England, assignors to Pye Ltd., Cambridge, England**

**Filed Aug. 23, 1973, Ser. No. 390,693**

**Claims priority, application United Kingdom, Aug. 25, 1972, 39733/72**

**Int. Cl.[2] G01N** *27/62, 31/12*

**U.S. Cl. 23—254 EF** **3 Claims**



1. In a flame ionisation detector for the detection of organic vapours or gases, said detector having a tubular metal body, a burner having a jet cap electrically insulated therefrom and adapted to serve as one electrode of the detector, said burner mounted substantially coaxially within said body at or adjacent one end thereof, a tubular metal electrode, means for mounting said tubular metal electrode substantially coaxially within said body including means electrically insulating said tubular metal electrode therefrom, said mounting means being located at or adjacent the end of said body remote from said burner, and means for introducing air under pressure into the space enclosed between said body and said tubular electrode at or adjacent the end of the body remote from said burner so that the incoming air first cools and purges said mounting means for said tubular electrode, then moves towards said burner through said enclosed space and away from said burner through said tubular electrode, the improvement comprising a rigid electrically conductive lead in electrical contact with said jet cap and mounted between and spaced from said body and said tubular electrode, and an insulating bushing mounted in said body at or adjacent the end remote from said burner, said lead exiting said body through said bushing.

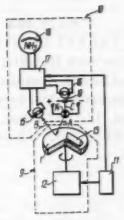
## 3,920,402
## PHOTOCOLORIMETRIC GAS ANALYZER

**Nikolai Gavrilovich Afanasiev, Bolshaya Cherkizovskaya ulitsa, 6, korpus 4, kv.52; Valery Leonidovich Zaitsev, Khibinsky proezd, 20v, and Vladimir Petrovich Kruglov, ulitsa Kominterna, 20/2, kv.24, all of Moscow, U.S.S.R.**

**Filed May 16, 1974, Ser. No. 470,551**

**Int. Cl.[2] G01N** *21/48, 31/22*

**U.S. Cl. 23—254 E** **1 Claim**



1. A photocolorimetric analyzer for testing gas mixtures having several components, the analyzer comprising a sensitive element made in the form of a gas-impermeable tablet consisting of a mixture of a selective reagent and an inert filler, and changing optical properties of its surface layer as a result of reaction between the reagent and one of the components of the gas mixture being analyzed; means for mechanically removing the surface layer, said means being made in the form of a scraper contacting the surface layer; power means to produce relative movement of the sensitive element and the scraper; a radiation source located on the side of the surface layer; a radiation detector to convert radiation reflected from the surface layer into an electrical signal; means for measuring the latter; and a control unit electrically connected with said removing means and with said measuring means, for controlling said lastnamed two means according to a preset program.

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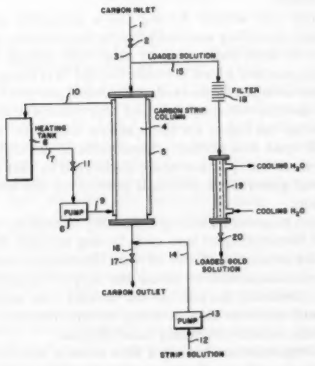
## 3,920,403
## METHOD OF DESORBING GOLD FROM ACTIVATED CARBON

**J. Richard Ross, deceased, late of Salt Lake City, Utah (by Maza C. Ross, administrator), assignor to The United States of America as represented by the Secretary of the Interior, Washington, D.C.**

**Filed Feb. 1, 1974, Ser. No. 438,906**

**Int. Cl.[2] C22B** *11/00*; **C25C** *1/20*

**U.S. Cl. 204—110** **7 Claims**




1. A method for recovering gold adsorbed on activated

carbon in the form of a gold cyanide complex which comprises:

contacting the gold-loaded carbon with a liquid selected from the group consisting of water, dilute caustic, and dilute caustic cyanide at a temperature in the range of 150° to 165°C whereby adsorbed gold cyanide is desorbed from the carbon and goes into solution in the liquid, and

recovering dissolved gold from the liquid.

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**3,920,404**

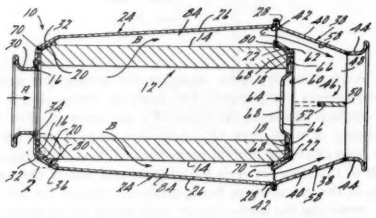
## CATALYST CONVERTER

**Haren S. Gandhi, Dearborn Heights; Walter K. Heintz, Westland, and Mordecai Shelef, Southfield, all of Mich., assignors to Ford Motor Company, Dearborn, Mich.**

**Filed Sept. 11, 1974, Ser. No. 505,120**

**Int. Cl.[2] B01J** *8/02, 35/04;* **F01N** *3/15*

**U.S. Cl. 23—288 FC** **2 Claims**



**1.** A catalytic converter comprising:

a radial flow catalyst substrate formed as a cylindrical body open at both ends and having an outer circumferential surface, an annular surface at opposite open ends thereof and an angularly inclined surface at each end interconnecting the cylindrical surface with each of the annular surfaces;

a first can section having (a) an elongated, generally cylindrical portion having a diameter greater than the diameter of the catalyst substrate and a length slightly less than the length of the catalyst substrate, said elongated, generally cylindrical portion being open at both ends, one of said ends thereon having a first mating surface, (b) a small end portion connectable to an exhaust pipe from an engine, and (c) an intermediate portion interconnecting said small end portion with the other open end of said elongated, generally cylindrical portion and providing internal locating surfaces for locating the annular and the inclined surfaces located at a first end of the catalyst substrate;

a second can section having (a) a generally cylindrical portion providing internal surfaces therewithin, and being open at both ends, one of said ends having a second mating surface which is bonded to the first mating surface of said elongated, generally cylindrical portion of the first can section whereby the first and second can sections form an enclosure for the catalyst substrate, and (b) a small open end portion connectable to an exhaust pipe said small end portion being connected to said other end of said generally cylindrical portion of the second can section;

a support member including a plurality of radially extending arms terminating at free ends having surfaces for engaging the internal surfaces of the cylindrical portion of the second can section to locate the support member within the cylindrical portion of the second can section, said support member also defining radially directed locating surfaces on the extending arms thereof;

a blocking member having a first surface received in the locating surfaces of the support member and a second surface providing locating surfaces for locating the annular and the inclined surfaces of a second end of the catalyst substrate; and

support and seal members located between (a) the angularly inclined surface at the first end of the catalyst substrate and the intermediate portion of the first can section and (b) the angularly inclined surface at the second end of the catalyst substrate and said blocking member, each of the support and seal members being identical in construction and comprising (i) a first annular ring, (ii) a second annular ring, both said first and second annular rings having an inclined annular portion at their inner portion said first and second annular rings being coupled at their inner portion thereof, the annular rings being spaced from one another over most of their radial extension, and (iii) a wire mesh interposed between the first and second annular rings, the inclined annular portion of the second annular ring having slots therein within which portions of the wire mesh may be received to anchor the mesh in the support and seal member.

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**3,920,405**

## PROCESS FOR PRODUCING SOLID ALUMINUM SULPHATE

**Johann Waldbauer, Krems, Donau, Austria, assignor to Krems-Chemie Gesellschaft m.b.H., Krems, Austria**

**Filed July 27, 1973, Ser. No. 383,436**

**Claims priority, application Austria, July 28, 1972, 6526/72**

**Int. Cl.[2] C01F** *7/74*

**U.S. Cl. 23—293 A** **15 Claims**

**1.** A process for the production of solid aluminum sulphate, comprising pouring a melt of aluminum sulphate on to a substrate to form a layer of said melt, spraying finely divided water on to the surface of said layer in a quantity sufficient to solidify the melt and achieve a dry crystallized surface in a substantially reduced period of cooling time without causing any dilution of the aluminum sulphate melt, and removing the solidified layer from the substrate.

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**3,920,406**

## PROCESS FOR THE PREPARATION OF ALUMINIUM HYDROXY HALIDE POWDERS

**Max Danner; Martin Krieg, both of Gersthofen, and Klaus Matschke, Burgkirchen, Alz, all of Germany, assignors to Hoechst Aktiengesellschaft, Frankford am Main, Germany**

**Filed Dec. 19, 1973, Ser. No. 426,309**

**Claims priority, application Germany, Dec. 3, 1972, 2263333**

**Int. Cl.[2] C01F** *7/48;* **B01D** *1/18*

**U.S. Cl. 23—293 A** **2 Claims**

**1.** Process for the preparation of colourless, watersoluble aluminium hydroxy chloride or bromide powders of the formula $Al_2(OH)_nX_z$, wherein X is the halogen, $n$ represents a number between 3.0 and 5.1, and the sum $n+z$ is always equal to 6, from the aqueous 20 to 50 by weight % solutions of basic aluminium chlorides and bromides with an atomic ratio of Al : X = 0.66 : 1 to 2.2 : 1, wherein aluminium salt solutions are sprayed in a spraying dryer, in which the drying gas is introduced in parallel flow and has a temperature of 290° to 500°C at the dryer entrance and wherein the ratio of the rate of the drying gas and the rate of water, contained in the aqueous aluminium salt solution and the inlet gas, is chosen in such way that the off gas of the dryer has a relative humidity in the range of 20 to 40% and the outlet temperatures are between 50° and 150°C.

3,920,407

## RUTHENIUM OR OSMIUM ON HARD METALS

**Brian Arthur Mynard, Worcestershire; Bryan Jones; Victor Allen Tracey, both of Warwickshire, and Walter Betteridge, Kent, all of England, assignors to The International Nickel Company, Inc., New York, N.Y.**

**Continuation-in-part of Ser. No. 256,889, May 25, 1972, Pat. No. 3,785,783. This application Dec. 26, 1973, Ser. No. 428,106**

**Int. Cl.[2] B22F** *1/00, 5/00, 7/04*

**U.S. Cl. 29—182.3** **4 Claims**

1. A cutting tool having deposited, at least on a portion of the surface thereof, a layer of metal from the group of osmium and ruthenium and mixtures and alloys thereof.

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3,920,408

## EXTRUSION EMPLOYED IN MAKING VALANCES

**Samuel J. Holtzman, Baltimore, Md., and Peter A. Cosme, Lockport, Ill., assignors to Roper Corporation, Kankakee, Ill.**

**Division of Ser. No. 187,088, Oct. 6, 1971, Pat. No. 3,724,057. This application Dec. 22, 1972, Ser. No. 317,390**

**Int. Cl. B21c** *23/00*

**U.S. Cl. 29—190** **1 Claim**

1. As an article of manufacture for use in making a pair of matched valances for luggage, an extrusion comprising a pair of integral male and female valance cross sections of relatively soft work hardenable aluminum each having a web portion and a mating portion, the web portions lying in a common plane, the female mating portion having a longitudinal, edgewise facing channel formed of a first wall lying approximately in the plane of the web portions and a laterally offset second wall defining a longitudinal groove between them, the male mating portion having a longitudinal edgewise facing projection alined with the longitudinal groove and of a height and width which is less than the height and width of the groove, the web portions having a longitudinally-extending relatively sharply bottomed groove between them serving as a parting line so that when the sections are subsequently sheared along the parting line, the resulting edges of the respective webs present a smooth finished appearance and so that when the sections are transposed in coplanar relation and bottomed edge-to-edge, the projection is centeringly received in the groove.

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3,920,409

## PLATED FERROMAGNETIC WIRE FOR WIRE MEMORY

**Satoshi Taniguchi, Kokubunji, Japan, assignor to Kabushiki Kaisha Hitachi Seisakusho, Japan**

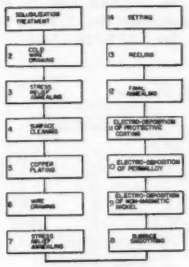
**Continuation of Ser. No. 834,080, June 17, 1969, abandoned. This application June 19, 1972, Ser. No. 264,155**

**Claims priority, application Japan, June 19, 1968, 43-41906**

**Int. Cl. B21f** *19/00;* **B23p** *3/00;* **G11c** *11/02*

**U.S. Cl. 29—191.6** **8 Claims**

1. A plated ferromagnetic wire usable as a memory element comprising a core wire consisting essentially of a copper-silver binary alloy containing from 0.2 to 10 atomic percent of silver, a layer of copper uniformly formed on the surface of said core wire, a non-magnetic nickel layer uniformly electroplated on said layer of copper, a layer of a permalloy uniformly electroplated on said non-magnetic nickel layer, a layer of nickel-cobalt binary alloy uniformly electroplated on said layer of a permalloy, said layers of a permalloy and a nickel-cobalt alloy having, respectively, an easy axis of magnetization circumferential about said core wire and a protective coating of non-magnetic nickel on said layer of a nickel-cobalt alloy.



5. A memory element comprising a core component consisting of a copper-silver binary alloy containing 0.2 to 99.5 atomic percent of silver, a copper layer electroplated on the surface of said core component, a non-magnetic nickel layer electroplated on the surface of said copper layer and at least one layer of a ferromagnetic material uniformly electroplated on the surface of said non-magnetic mickel layer.

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3,920,410

## COBALT COATED COMPOSITE POWDER

**Wasyl Kunda, and Donald Alan Randell, both of Fort Saskatchewan, Canada, assignors to Sherritt Gordon Mines Limited, Toronto, Canada**

**Division of Ser. No. 138,313, April 28, 1971, Pat. No. 3,730,756. This application Jan. 29, 1973, Ser. No. 327,479**

**Int. Cl. B22f** *1/00*

**U.S. Cl. 29—192 R** **3 Claims**

1. A powder composition comprising a central core composed of calcium fluoride, an inner layer composed of nickel within which said central core is encased and an outer layer composed of cobalt.

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3,920,411

## ALUMINUM ALLOY ELECTRICAL CONDUCTOR AND METHOD FOR MAKING SAME

**Roger J. Schoerner, and Enrique C. Chia, both of Carrollton, Ga., assignors to Southwire Company, Carrollton, Ga.**

**Continuation of Ser. No. 199,729, Nov. 17, 1971, abandoned, which is a division of Ser. No. 54,563, July 13, 1970, abandoned. This application Jan. 2, 1974, Ser. No. 430,300The portion of the term of this patent subsequent to Apr. 30, 1991, has been disclaimed.**

**Int. Cl.[2] B21C** *1/00;* **C22F** *1/04*

**U.S. Cl. 29—193** **28 Claims**

1. Aluminum alloy electrical conductor having a minimum conductivity of 58% IACS consisting essentially of from about 0.35 to about 4.0 weight percent cobalt, from about 0.1 to about 2.5 weight percent iron, the remainder being aluminum with associated trace elements, said aluminum alloy electrical conductor having the following properties when measured as a No. 10 A.W.G. fully annealed wire:

| | |
|---|---|
| Tensile strength | 12,000 – 24,000 psi |
| Elongation: | 12% – 30% |
| Yield strength: | 8,000 – 18,000 psi. |

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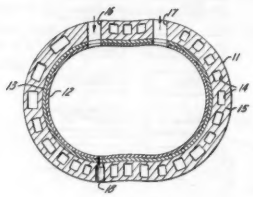
**3,920,412**

## HARD-SURFACED CASTINGS AND METHOD OF PRODUCING THE SAME

**Charles Jones, Hillsdale, N.J., assignor to Curtiss-Wright Corporation, Wood-Ridge, N.J.**

**Division of Ser. No. 373,514, June 25, 1973, Pat. No. 3,878,880. This application Oct. 7, 1974, Ser. No. 512,412**
**Int. Cl.[2] B32B** *15/04*
**U.S. Cl. 29—195** **10 Claims**




**1.** A pressure-cast article having at least a portion of its surface coated with a selected thickness of a hard facing material, wherein the improvement comprises:

a. the hard facing material being a metalloid material selected from the group consisting of tungsten, cobalt, molybdenum, tungsten carbide, cobalt carbide, molybdenum carbide, silicon carbide and titanium carbide;

b. a metallic layer underlying the hard facing, the underlying layer being from three to twenty times the thickness of the hard facing and being selected from the group consisting of the aluminum family and the copper family, the underlying layer being firmly united to the hard facing material;

c. the body of the casting being a metal selected from the group consisting of alloys of aluminum, magnesium, and zinc, the metal of the body of the casting being firmly united to the underlying layer; and

d. the hard facing, the underlying layer, and the body of the casting all being integral portions of the cast article.

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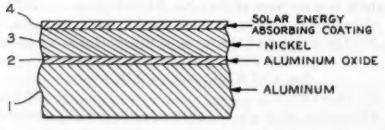
Solar Energy

**3,920,413**

## PANEL FOR SELECTIVELY ABSORBING SOLAR THERMAL ENERGY AND THE METHOD OF PRODUCING SAID PANEL

**James R. Lowery, Decatur, Ala., assignor to The United States of America as represented by the Administrator of the National Aeronautics and Space Administration, Washington, D.C.**

**Filed Apr. 5, 1974, Ser. No. 458,484**
**Int. Cl.[2] B23P** *3/00*; **C25D** *5/12*
**U.S. Cl. 29—197** **6 Claims**




**1.** A method for producing on a metallic substrate a coating which selectively absorbs solar thermal energy, which comprises the steps of cleaning the metallic substrate, preparing said metallic substrate to receive a brightening layer of bright nickel, electroplating the brightening layer of bright nickel to said metallic substrate, and applying a solar thermal energy absorbing coating of black nickel to said bright nickel brightening layer, said black nickel coating being applied by electroplating at room temperature from an aqueous bath containing nickel (II) sulfate hexahydrate, nickel (II) ammonium sulfate hexahydrate, zinc sulfate heptahydrate and sodium thiocyanate at a pH from about 5.6 to about 5.9 and a current density between about 0.5 and about 4.0 amperes per square foot, said black nickel coating being between 800 and 5,000 angstroms in thickness whereby the resulting coated metallic substrate has a solar absorptance ($\alpha$) of at least 0.90 and a thermal emissivity ($\epsilon$) not exceeding 0.06.

**4.** A panel for absorbing solar thermal energy comprising:

an aluminum substrate;

a layer of bright nickel carried on said substrate;

a solar thermal energy absorbing coating of black nickel carried on said bright nickel distal from said metallic substrate;

said black nickel coating being between 800 angstroms and 5,000 angstroms in thickness;

said panel having a solar absorptance ($\alpha$) of at least 0.90 and a thermal emittance ($\epsilon$) less than about 0.06;

a layer of zinc being interposed between said aluminum substrate and said layer of bright nickel material.

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**3,920,414**

## CRUDE OILS CONTAINING NITROGEN DISPERSANTS AND ALKOXYLATED ASHLESS SURFACTANTS USABLE AS DIESEL FUELS

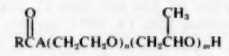
**David E. Steere, Sarnia, Canada, and Thorkild F. Lonstrup, Goring on Thames, England, assignors to Exxon Research & Engineering Co., Linden, N.J.**

**Filed Oct. 27, 1972, Ser. No. 301,612**
**Int. Cl.[2] C10L** *1/24*
**U.S. Cl. 44—66** **7 Claims**

**1.** An oil composition suitable for use as a fuel in a compression engine comprised of a major amount of a synthetic or natural crude oil containing less than 1 wt. % sulfur and less than 3.0 pounds of inorganic salts per 1000 barrels of oil, having an API gravity of about 25° to 45° at 60°F, a distillation boiling range of 160° to 1100°F and minor but engine deposit reducing amounts of:

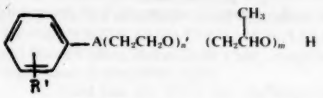
a. one or more ashless dispersants selected from the group consisting of alkylene polyamine or polyol condensation products of: (i) alkenyl substituted dicarboxylic acids or their anhydrides or (ii) alkenyl substituted monocarboxylic acids or their anhydrides, said alkenyl group containing between about 50 and 250 carbon atoms; and

b. one or more ashless, oil soluble surfactants selected from the group consisting of: (i) alkoxylated fatty acid esters of the general formula:

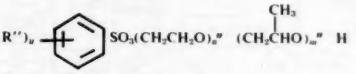


$$RCA(CH_2CH_2O)_n(CH_2\underset{CH_3}{CH}O)_mH$$

wherein R is a $C_1$ to $C_{30}$ aliphatic group, A is an oxygen or sulfur atom, n and m are each numbers from 0 to 14 and the sum of $n + m$ is between 2 to 14; (ii) an alkoxylated alkyl phenol of the general formula:



wherein A is as defined above, R' is a $C_1$ to $C_{20}$ alkyl group, $n'$ and $m'$ are each numbers from 0 to 14 and the sum of $n' + m'$ is between about 6 and 14; and (iii) alkoxylated sulfonic acids of the general formula:



wherein R'' is a $C_1$ to $C_{20}$ hydrocarbyl group, $n''$ and $m''$ are each numbers between 0 and 16, the sum of $n'' + m''$ is between about 6 and 16, and $y$ is 0 to 4.

## 3,920,415

## ODOR INHIBITION FOR PARAFFIN HYDROCARBONS

**Robert E. Reusser, and Lawrence O. Meyer, both of Bartlesville, Okla., assignors to Phillips Petroleum Company, Bartlesville, Okla.**

**Filed Jan. 15, 1974, Ser. No. 433,836**
**Int. Cl.[2] C10L** *1/22*
**U.S. Cl. 44—75** **4 Claims**

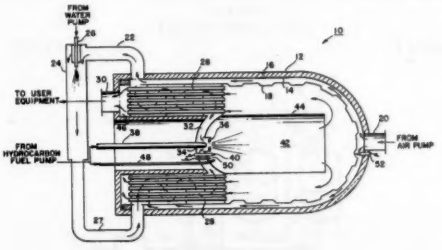
1. A composition of matter consisting essentially of a mixture of branched paraffin hydrocarbons having a boiling point in the range of about 240°F to about 345°F and a stabilizing amount of 2,4,6-tris-(dimethyl aminomethyl)phenol.

## 3,920,416

## HYDROGEN-RICH GAS GENERATOR

**John Houseman, Pasadena, Calif., assignor to California Institute of Technology, Pasadena, Calif.**

**Filed Dec. 26, 1973, Ser. No. 428,444**
**Int. Cl.[2] C10J** *3/00*
**U.S. Cl. 48—95** **5 Claims**




1. In a hydrogen rich gas generator of the type comprising thermally insulated walls defining a hollow chamber, vortex means positioned centrally within said hollow chamber for mixing air, steam and a hydrocarbon fuel, means for igniting said mixture to produce hot hydrogen rich gases, a thermally conducting inner wall spaced from said insulated walls and within said chamber to define an air preheating passageway therewith, said inner wall being heated by said hot hydrogen rich gases, means for removing said hydrogen rich gases from one end of said chamber, means defining a source of air under pressure, means to convey air from said source to one end of said passageway to be heated by said inner wall, and means for connecting said first passageway to said vortex means to apply heated air thereto, the improvement comprising

means defining a source of water,

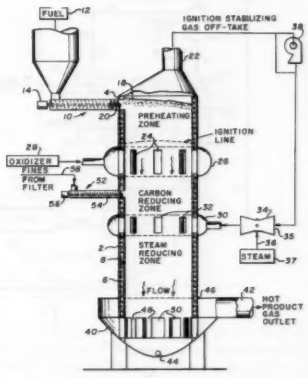
water spray forming means connected to said source of water and positioned within said passageway for spraying water therein which is converted into steam by said heated air and caried thereby to said vortex means.

## 3,920,417

## METHOD OF GASIFYING CARBONACEOUS MATERIAL

**John Henry Fernandes, Windsor, Conn., assignor to Combustion Engineering, Inc., Windsor, Conn.**

**Filed June 29, 1973, Ser. No. 375,220**
*Disclosure was also published under Trial Voluntary Protest Program on Jan. 28, 1975.*
**Int. Cl.[2] C10J** *3/08*
**U.S. Cl. 48—197 R** **8 Claims**




1. A method for producing a fuel gas from a carbonaceous material which comprises:

a. providing a substantially vertical shaft furnace having a preheating zone adjacent the upper end of the furnace, an oxidation zone underlying said preheating zone, and a reducing zone underlying said oxidation zone and adjacent the lower end of the furnace;

b. introducing a solid carbonaceous material having sufficient compressive strength to support a carbon matrix into said preheating zone;

c. oxidizing said carbonaceous material in said oxidation zone by reacting said carbonaceous material with free oxygen to form an intermediate gaseous product, a char matrix containing carbon, and molten slag;

d. reacting said intermediate gaseous products with steam and with carbon from said char matrix in said reducing zone to form a product gas comprising principally hydrogen and carbon monoxide;

e. flowing said molten slag downward through said char matrix;

f. removing said slag through the bottom of said furnace shaft;

g. maintaining an upward flow of a portion of the gases formed in said oxidation and reducing zones sufficient to maintain the level of ignition of said carbonaceous material in said oxidation zone at a predetermined level, said upward flow of gas passing through said preheating zone and contacting said carbonaceous material, whereby said material is dried, devolatilized and heated to a temperature just under its ignition temperature, the volatile matter driven from the carbonaceous material being carried from said furnace along with said portion of said gases and re-introducing said portion of the gases and volatile matter into said furnace in said reducing zone;

h. exhausting the balance of said product gas from the lower end of said furnace.

## 3,920,418
## PROCESS FOR MAKING LIQUID AND GASEOUS FUELS FROM CAKING COALS

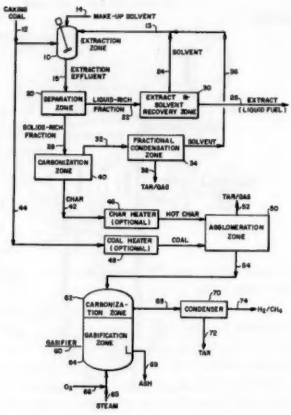
**Charles H. Rice, Pittsburgh, Pa., assignor to Consolidation Coal Company, Pittsburgh, Pa.**

**Continuation-in-part of Ser. No. 215,160, Jan. 3, 1972, abandoned. This application Sept. 10, 1973, Ser. No. 395,671**

*Disclosure was also published under Trial Voluntary Protest Program on Jan. 28, 1975.*

**Int. Cl.**[2] **C10G** *1/04*; **C10J** *3/00, 3/16*

**U.S. Cl. 48—210** **4 Claims**




**1.** In a coal conversion process which includes extraction by means of a solvent of a finely divided caking coal, whereby a mixture of extract, solvent and undissolved carbonaceous residue is produced, the IMPROVEMENT which comprises:

a. effecting separation of said mixture into at least two parts, the first part being a liquid-rich fraction containing principally extract and solvent, and the second part being a solids-rich fraction, the solids having a finer size consist than said feed coal;

b. subjecting said solids-rich fraction to carbonization to yield finely divided char having a size consist for the greater part less than ⅛ inch;

c. mixing caking coal having a size consist for the greater part less than ⅛ inch with said char;

d. subjecting the mixture from step (c) to agglomeration above the temperature at which the caking coal begins to soften, whereby agglomerates are formed having a minimum size of ⅛ inch; and

e. subjecting said agglomerates first to carbonization and then to gasification in a downwardly moving bed gasifier, whereby a gaseous fuel is produced.

## 3,920,419
## METHOD OF REMOVING AMMONIA FROM AMMONIA CONTAINING LIQUOR

**James W. Schroeder, Parma, and Anthony C. Naso, Cleveland, both of Ohio, assignors to Republic Steel Corporation, Cleveland, Ohio**

**Filed Apr. 10, 1974, Ser. No. 459,461**

**Int. Cl.**[2] **B01D** *19/00*

**U.S. Cl. 55—70** **11 Claims**

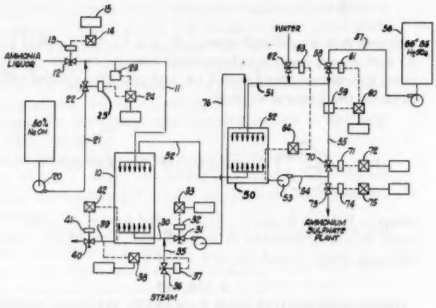
**1.** A method of removing ammonia from an ammonia containing liquor comprising the steps of:

a. feeding the liquor to the top of a packed column;

b. automatically monitoring the pH of the feed liquor;

c. automatically adding caustic soda in controlled amounts to the feed liquor prior to introduction into the column to maintain a minimum pH of 10.5;

d. counterflowing a gaseous stripping median through the column at the minimum temperature of about 140°F;




e. regulating the flow of the feed liquor to the column; and

f. controlling the flow of the stripping medium in direct relation to the amount of feed liquor so that at least 99% of the ammonia is removed from the liquor.

## 3,920,420
## METHOD AND DEVICE FOR INJECTING LIQUID SAMPLES INTO A SYSTEM FOR CHROMATOGRAPHIC SEPARATION IN GAS PHASE

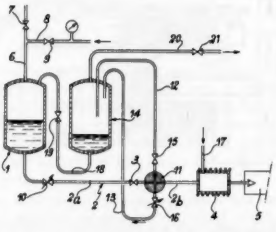
**Patrick Valentin, Pont Eveque, and Germain Hagenbach, Meyzieu, both of France, assignors to Entreprise De Recherches et D'Activities Petrolieres Elf, Paris, France**

**Filed Apr. 18, 1974, Ser. No. 462,060**

**Claims priority, application France, May 4, 1973, 73.16247**

**Int. Cl.**[2] **B01D** *15/08*

**U.S. Cl. 55—67** **7 Claims**

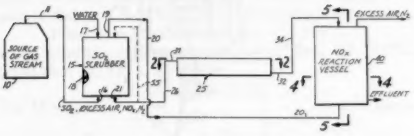


**1.** A method of injecting a liquid sample into a gas chromatographic column in a gas phase of the type including periodically supplying a predetermined quantity of the liquid sample to a vaporizing zone through a pipe from a valved control point, vaporizing the liquid sample in the vaporizing zone, mixing the vaporized sample with a carrier gas continuously sweeping the vaporizing zone and injecting the resulting mixture of vapor and carrier gas into the gas chromatographic column, with the improvements comprising rapidly purging the pipe up to the valved control point of all liquid after supplying the liquid sample to the vaporizing zone and continuously purging the pipe up to the valved control point during the periods that there is no liquid or vaporized sample in the vaporizing zone.

## 3,920,421
## REMOVAL OF OXIDES OF NITROGEN FROM GAS STREAMS WHICH ALSO CONTAIN SULFUR DIOXIDE

**Dwight Dixon Collins, Bakersfield, Calif., assignor to Chemsoil Corporation, Bakersfield, Calif.**

**Filed Jan. 15, 1974, Ser. No. 433,546**
**Int. Cl.² B01D** *53/14*
**U.S. Cl. 55—73** **19 Claims**




1. A method for removing sulfur dioxide and oxides of nitrogen from a gas stream containing both, comprising the following steps:

a. contacting the gas stream with water to absorb the sulfur dioxide in the water, thereby to form a sulfurous acid solution;

b. adding a multi-valent metal selected from the group consisting of iron, copper, cobalt, chromium, nickel, manganese, mercury, tin, titanium, arsenic, lead, mixtures of two or more of these metals, and iron-aluminum compounds, to the sulfurous acid solution to form a metal-containing solution; and

c. contacting the gas effluent after the absorption of sulfur dioxide with the metal-containing solution to reduce the nitrogen in the oxides of nitrogen to elemental nitrogen.

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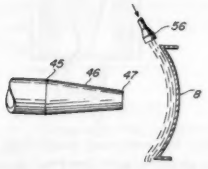
## 3,920,422
## POLLUTION CONTROL APPARATUS AND METHOD

**Ladislav J. Pircon, Elmhurst, Ill., assignor to The Purity Corporation, Elk Grove Village, Ill.**

**Continuation-in-part of Ser. No. 190,248, Oct. 18, 1971, Pat. No. 3,853,506. This application May 12, 1972, Ser. No. 252,914**
**Int. Cl.² B01D** *47/06*
**U.S. Cl. 55—90** **13 Claims**




1. A process having a pressure drop of about 0.4 to 8 inches of water for removing particulate matter from pollutant containing industrial effluvia gas streams comprising passing said gas stream having particulate matter therein through the entry of a nozzle; accelerating the gas stream through a converging portion of said nozzle having a mean angle of convergence of about 40° to 8° providing outlet velocities of about 2 to 12 times the entrance velocity; passing said particulate-containing gas stream from the nozzle outlet through an expansion zone decelerating the gas, said acceleration and deceleration of the gas stream causing particulates to agglomerate; impinging said agglomerates and particulates upon an impingement means of a fixed concave imperforate surface having a water stream provided across said surface, thereby separating said particulates and agglomerates from said gas stream, said nozzle outlet having a diameter about 0.5 to 0.7 times the distance from said outlet to said impingement means; removing said particulates and agglomerates from the expansion zone; and separately removing clarified gas from the expansion zone.

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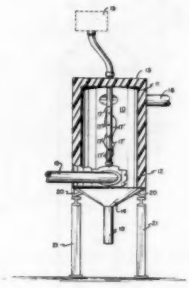
## 3,920,423
## POLYMERIC STEAM SCRUBBER TO CONTROL PARTICULATES

**Samuel Scott Ross, 1570 Sunset Strip, Mountain Home, Idaho 83648**

**Filed Jan. 14, 1974, Ser. No. 433,040The portion of the term of this patent subsequent to Dec. 18, 1990, has been disclaimed.**
**Int. Cl. B01d** *50/00*
**U.S. Cl. 55—103** **4 Claims**



1. In a steam scrubber including upstanding cylindrical walls, a flat, horizontally disposed enclosure wall fastened to the uppermost terminal end of said cylindrical walls, and downwardly projecting cone-shaped walls fastened to the lowermost terminal end of said cylindrical walls, said steam scrubber provided with a steam conduit dependingly mounted from said tank enclosure wall, said steam conduit having a multiplicity of suitably disposed exitways closed at the bottom and connected to steam source and said steam scrubber tank having an inlet conduit disposed at a tangent to said steam scrubber and an exitway duct disposed distally from the uppermost terminal end of said steam scrubber cylindrical walls, the improvement of an electrostatic tank construction for steam scrubbers wherein said walls of said tank are fabricated of polymeric material of high electrostatic potential and low heat deformation.

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## 3,920,424
## LIQUID SULPHUR GAS SCRUBBER APPARATUS

**James W. Estep, and Edward W. Plum, both of Calgary, Canada, assignors to Texasgulf Inc., New York, N.Y.**

**Continuation-in-part of Ser. No. 227,047, Feb. 17, 1972, Pat. No. 3,807,141, which is a division of Ser. No. 115,648, Feb. 16, 1971, abandoned. This application Mar. 5, 1974, Ser. No. 448,298**
**Int. Cl.² B01D** *53/00*
**U.S. Cl. 55—193** **7 Claims**

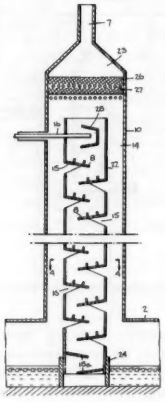
1. A liquid sulphur gas scrubber apparatus for removing hydrogen sulphide and polysulphides from liquid sulphur disposed in an enclosed reservoir, comprising:

an elongated outer casing communicative with and extending vertically upwardly from said reservoir and including a gas discharge passage for venting gas externally of said casing;

liquid sulphur downflow passage means, disposed within said casing and extending downwardly into said reservoir, including a first plurality of spaced-apart openings disposed in one side of said passage means, and a second plurality of spaced-apart openings disposed in an opposing side thereof and offset with respect to said first pluraity of openings, said casing and said passage means defining therebetween at least within a portion of said casing an annular gas venting passage communicative with said

openings for venting gas from said passage means into said casing and externally of said casing through said gas discharge passage;

a plurality of vertically spaced-apart, downwardly canted baffle plates, disposed in said passage means and extending inwardly thereinto above each of the openings of said first and second plurality of openings in alternating fashion, each of said plates extending into said passage means beyond the edge of the next lower adjacent baffle plate so as to form a cascade downflow path for the liquid sulphur in said passage means; and



means, coupled to said reservoir and extending inwardly into said passage means, for supplying liquid sulphur from said reservoir to the vertically uppermost of said baffle plates, said liquid sulphur downflow passage means being formed by a elongated cylinder coaxially disposed within said outer casing and in the portion of said casing disposed above the reservoir by a plurality of vertically disposed plates disposed within and spaced apart from said casing so as to define said annular gas venting passage, and in the portion of said casing disposed within the reservoir by said casing.

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**3,920,425**

**EXTRACTOR FOR AIRBORNE PARTICULATE MATTER**

**Frederick W. Grantham, 12055 Goshen Ave., Los Angeles, Calif. 90066**

**Filed Mar. 29, 1974, Ser. No. 456,057**

**Int. Cl.[2] B01D** *47/00*

**U.S. Cl. 55—227** **10 Claims**

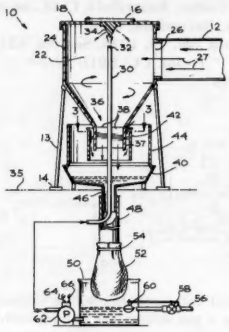
1. Apparatus for extracting airborne particulates, said apparatus including:

a mixing chamber having an upper opening for the introduction of airborne particulates into said chamber and including means for producing a mixture of a settling liquid and said particulates, the chamber further having a lower opening for the downward passage of air and said mixture therefrom and a closed top portion cooperative with the remainder of said chamber to direct the flow of air out through said lower opening;

a basin positioned below the mixing chamber to collect the mixture of liquid and particulates while allowing the air to escape, said basin including a centrally located aperture near the bottom thereof;

particulate collector means formed of liquid permeable material and coupled to receive the flow of said mixture from said aperture of said basin for collecting the particulates from the liquid; and

a reservoir for said settling liquid, said reservoir being positioned below said particulate collector means;



said means for producing a mixture of a settling liquid and said particulates including means for producing a stream of settling liquid and means positioned opposite said stream producing means for producing an even dispersal of said settling liquid.

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**3,920,426**

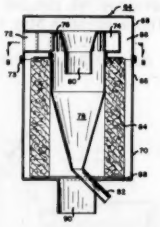
**AIR FILTER**

**Peter K. C. Tu, Westerville; Alan H. Brooke, Hudson, both of Ohio, and Frank S. Miller, Norwell, Mass., assignors to Rockwell International Corporation, Pittsburgh, Pa.**

**Continuation of Ser. No. 335,997, Feb. 26, 1973, abandoned, Division of Ser. No. 126,046, March 19, 1971, abandoned. This application May 22, 1974, Ser. No. 472,410**

**Int. Cl.[2] B01D** *50/00*

**U.S. Cl. 55—337** **1 Claim**



1. An air filter for removing particulate matter and other impurities from an air stream comprising a generally cylindrical casing with a central axis and with multiple inlet passages extending from an outer surface of casing inwardly toward said central axis to communicate with a common inlet duct which encircles a central generally cylindrical baffle; said inlet duct having a series of openings through its interior wall adjacent said cylindrical baffle and a series of vanes to impart a preswirling motion to the uncleansed particulate-laden air passing through said openings into an inertial separating means centrally disposed within said casing; said inertial separating means including a cyclone separator having a lower, conically-shaped section and adapted to remove relatively heavy particles from the air stream; said cylindrical baffle having an interior passage therethrough communicating with a region above said inlet duct and spaces between said inlet passages for efficiently directing the air stream from said inertial separating means to the outer surface of the filter media of a filter enclosed within said casing and surrounding and coaxial with the entire length of said inertial separating means; said filter media removing substantially all of the re-

maining particulate matter and impurities from said air stream; and air guide means including the exterior surface of said conically-shaped section of said cyclone separator for efficiently directing the now cleansed air out of said air filter and through an outlet air passage at the lower end of said casing.

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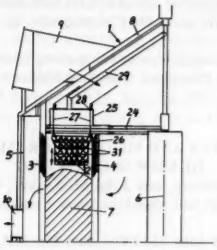
**3,920,427**
**APPARATUS FOR THE PURIFICATION OF COMBUSTION GASES**

**Friedrich Lachnit, Muehlheim (Ruhr), Germany, assignor to Deutsche Babcock & Wilcox A.G., Oberhausen, Germany**

**Filed Dec. 11, 1973, Ser. No. 423,673**
**Claims priority, application Germany, Dec. 15, 1972, 2261304; Oct. 11, 1973, 2351001**
**Int. Cl.[2] B01D** *51/00*
**U.S. Cl. 55—418** **11 Claims**



**1.** Apparatus for the purification of combustion gases comprising a housing, inlet means for admitting combustion gases to said housing, outlet means for discharging purified gases from said housing, two substantially vertical perforated walls disposed in said housing, said perforated walls being spaced from one another and defining a filtering chamber therebetween, a filtering material substantially filling said filtering chamber, partitioning means partitioning said filter chamber into a plurality of at least three operable segments, a rotatably mounted control cover mounted in said housing and operable to selectively preclude the flow of combustion gases to at least two of said filter segments while permitting the combustion gases to flow to at least one of the remaining filter segments, and charging means for charging filter material into one of said two filter segments to which flow has been precluded by said control cover, said charging means being coupled to said rotatably mounted cover.

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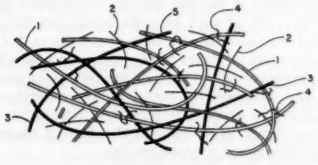
**3,920,428**
**FILTER ELEMENT**

**Homan B. Kinsley, Jr., Richmond, Va., assignor to Ethyl Corporation, Richmond, Va.**

**Filed Mar. 25, 1974, Ser. No. 454,375**
**Int. Cl.[2] B01D** *39/16*
**U.S. Cl. 55—528** **7 Claims**



**1.** A filter element of high strength and good flex useful in filtration of particulates from gas at elevated temperatures, said filter element comprising a non-woven mat of glass fibers and aromatic polyamide fibers, said aromatic polyamide fibers being fused to said glass fibers, said aromatic polyamide fibers being a mixture of fibrids and short fibers of poly(m-phenylene isophthalamide).

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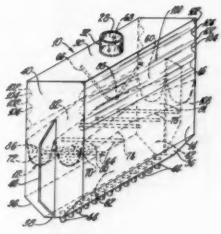
**3,920,429**
**STREAM FEEDER FOR MAKING GLASS FIBERS**

**Charles J. Stalego, Newark, Ohio, assignor to Owens-Corning Fiberglas Corporation, Toledo, Ohio**

**Filed May 28, 1974, Ser. No. 474,295**
**Int. Cl.[2] C03B** *37/02*
**U.S. Cl. 65—1** **11 Claims**



**1.** An electrically heated stream feeder for supplying heat-softened glass in filament forming condition comprising:

a chamber having an opening for supplying portions of unmelted glass for conversion to a heat-softened flowable body of glass;

a bottom wall for the chamber having at least one orifice for discharging heat-softened glass as a stream;

two pairs of opposed generally upstanding walls for the chamber;

means for supplying electrical current to the feeder; and

a perforated current conducting heating strip extending across the chamber in spaced relation above the bottom wall for converting the portions of glass into a heat-softened flowable body, such heating strip including at least a portion sloping downwardly to one of the generally upstanding walls, the portion defining an elongated channel sloping downwardly to the one generally upstanding wall, the sloping portion urging the glass portions towards such one upstanding wall along the channel during glass melting.

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**3,920,430**
**SUPPORT FOR BUSHING FOR CONTAINING MOLTEN MINERAL MATERIAL**

**Robert P. Carey, Columbus, Ohio, assignor to Owens-Corning Fiberglas Corporation, Toledo, Ohio**

**Continuation of Ser. No. 404,472, Oct. 9, 1973, abandoned. This application Oct. 15, 1974, Ser. No. 514,524**
**Int. Cl.[2] C03B** *37/02*
**U.S. Cl. 65—1** **16 Claims**

**1.** A bushing for containing molten mineral material from which fibers can be attenuated, said bushing comprising upright walls and a bottom wall extending between said upright walls, said bottom wall having a plurality of orifices through which molten mineral material can flow for attenuation into fibers, and supporting means connected to said bottom wall to provide support for said bottom wall in order to increase the

dimensional stability thereof and reduce creep or sag over a period of time, said supporting means comprising an elongate member extending between two upright walls above said bottom wall, and means connecting said elongate member to said bottom wall.

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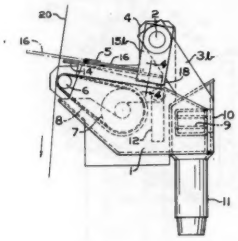
**3,920,431**
**BINDER APPLICATOR FOR GLASS FIBER COATING AND METHOD OF USING**

**Walter J. Reese, North Huntington, Pa., assignor to PPG Industries, Inc., Pittsburgh, Pa.**

**Filed Sept. 12, 1974, Ser. No. 505,394**
**Int. Cl.[2] C03B** *37/02*
**U.S. Cl. 65—3** **9 Claims**




**1.** An applicator for use in applying solutions of binders and/or sizes to filaments comprising a housing having side walls, a bottom and a top spaced above at least one of said side walls, an endless belt constructed to ride around at least two rollers positioned within said housing, an opening at the front of said housing through which the belt protrudes as it passes over one roller, an elongated slot inside of said housing and formed by spacing said top above one of said side walls, said slot being located at a point inside of said housing remote from said opening at the front of said housing, and means to pass said belt in contact with fluid in said housing to apply fluid to the surface thereof.

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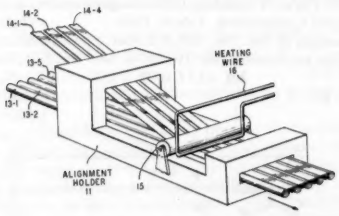
**3,920,432**
**METHOD OF FABRICATING AN OPTICAL FIBER RIBBON**

**Peter William Smith, Colts Neck, N.J., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.**

**Filed Aug. 30, 1974, Ser. No. 502,178**
**Int. Cl.[2] C03C** *23/20*; **C03B** *11/08*; **G02B** *5/14*
**U.S. Cl. 65—4** **3 Claims**




**1.** A method of fabricating an optical fiber ribbon of the type in which a plurality of fiber waveguides are rigidly fixed in precise positions relative to each other, comprising the steps of:

feeding said fiber waveguides through a holder which includes a plurality of spaced longitudinal grooves dimensioned for receiving said fiber waveguides and aligning them in predefined positions relative to each other, said fiber waveguides being formed of a first, optically transparent glass composition;

feeding between each adjacent pair of said fiber waveguides in said holder a spacing fiber having a cross-sectional size and shape sufficient to contact both of said fiber waveguides in said adjacent pair and to prevent movement of said fiber waveguides in said adjacent pair both vertically and laterally in said holder, said fiber waveguides and said spacing fibers being continuously moved relative to said holder while said fiber waveguides remain in contact with said grooves, said spacing fibers being formed of a second glass composition having a softening temperature $T_s$ which is less in value than the softening temperature $T_f$ of said fiber waveguides;

heating said spacing fibers as they are moved through said holder to a temperature above $T_s$ but below $T_f$ thereby to fuse said spacing fibers to said fiber waveguides at the regions of contact therebetween;

allowing said spacing fibers to cool sufficiently while in said holder to fix said fiber waveguides in the predefined positions; and

removing the assembly of said spacing fibers and said fiber waveguides thus fixed from said holder.

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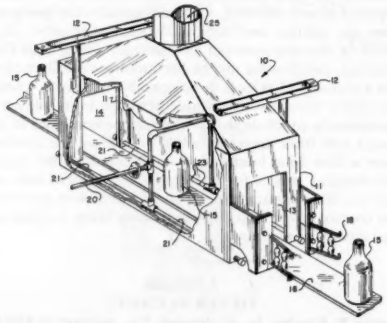
**3,920,433**
**APPARATUS AND METHOD FOR IMPROVED GLASSWARE COATING**

**Clement V. Fogelberg, and John M. Kujave, both of Arvada, Colo., assignors to Columbine Glass Company, Wheatridge, Colo.**

**Filed June 25, 1973, Ser. No. 373,326**
*Disclosure was also published under Trial Voluntary Protest Program on Jan. 28, 1975.*
**Int. Cl.[2] C03C** *17/10*
**U.S. Cl. 65—60** **12 Claims**




**1.** Glassware treating apparatus, comprising: an enclosure having entrance and exit openings defined in opposite ends thereof, conveyor means positioned adjacent the lower portion of the enclosure and aligned with both the entrance and exit openings, and treatment gas distribution means located with the enclosure to provide streams of treatment gas within the enclosure, all of such streams being directed partially towards the conveyor directions between about 10° and 80° from the direction of travel of the conveyor belt with a substantial component of velocity of the treatment gas streams being in the direction of travel of the conveyor means, whereby glassware carried through the enclosure on the conveyor means tends to travel with the moving treatment gas rather than through the treatment gas.

**6.** Glassware treating apparatus, comprising: an enclosure with entrance and exit openings defined in opposite ends thereof, a conveyor belt positioned at the lower portion of the enclosure and aligned through both the entrance and exit openings, conduit means communicating both with the exte-

rior and interior of the enclosure for supplying treatment gas to the interior of the enclosure, treatment gas manifolds connected to the conduit means and disposed in the enclosure along opposite sides of the conveyor belt, and inlet orifices defined in the manifolds and all oriented with a substantial component in the direction of travel of the conveyor belt and with a component in the direction of the glassware.

12. A method of treating glassware with a treatment gas dispersed in a carrier gas, comprising: conveying glassware through an enclosure and directing all streams of treatment gas and carrier gas both towards the glassware and with a substantial component of movement of the treatment gas in the direction in which the glassware is conveyed.

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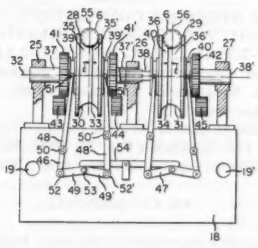
## 3,920,434
## APPARATUS FOR RESHAPING OR BENDING TUBULAR ENVELOPES OF FLUORESCENT LAMP ASSEMBLIES INTO ANNULAR FORM

**Tsutomu Ishisaka, Takatsuki, Japan, assignor to Matsushita Electronics Corporation, Osaka, Japan**

**Filed July 24, 1974, Ser. No. 491,271**
**Claims priority, application Japan, Aug. 2, 1973, 48-87392**
**Int. Cl.² C03B** *23/06*
**U.S. Cl. 65—276** **1 Claim**



1. In an apparatus for reshaping two rectilinear envelopes of fluorescent lamp assemblies into an annular form, the apparatus having two pulley-shaped mold assemblies having annular grooves around the peripheries thereof for wrapping rectilinear envelopes of fluorescent lamp assemblies, each of said mold assemblies comprising a pair of half sections divided by vertical parting planes at right angles to the axes of said mold assemblies, said mold assemblies being mounted in a retaining structure in a position wherein one half of each mold assembly faces a corresponding half of the other mold assembly and is adjacent thereto,

the improvement wherein

said vertical parting planes asymmetrically divide the mold assembly, whereby one of said half sections of each mold assembly is thinner in the axial direction than the other half section,

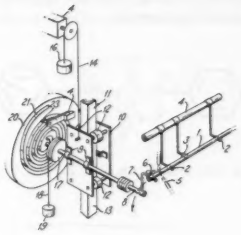
wherein the thinner half sections of each mold assembly are those corresponding halves of each mold assembly that are mounted adjacent each other in the retaining structure, and wherein the distance between said corresponding thinner half sections of said mold assemblies is sufficient only to permit opening of said mold assemblies and removal of said fluorescent lamp assemblies,

whereby the axial displacement of said thinner half sections for removal of said fluorescent lamp assemblies is shortened by a distance equal to one half of the difference in thickness between each of said pairs of half sections as compared with the corresponding distance when said half sections are symmetrically divided.

## 3,920,435
## GLASS TUBE BENDING APPARATUS

**Donald Curtis, Stone, England, and Anthony Martin Hooper, Brockville, Canada, assignors to James A. Jobling & Company Limited, Durham, England**

**Filed Sept. 9, 1974, Ser. No. 504,188**
**Int. Cl.² C03B** *23/06*
**U.S. Cl. 65—281** **8 Claims**



1. An apparatus for continuously bending an advancing glass element comprising a frame, guide means supported by said frame to support and guide said advancing element, a heating device disposed in the path of movement of said element to heat it continuously locally as it advances with respect to said guide means, a carriage displaceably mounted with respect to said frame to move towards and away from said heating device, a shaft mounted in said carriage and rotatable about an axis normal to the direction of movement of said carriage and to the axis of said element, a cam member and a cooperating cam follower member, one of said members being rotatable with said shaft to cause displacement of said carriage, a clamp engageable with said element and rotatable by said shaft, and power operated means to rotate said shaft at a substantially constant torque, whereby as said glass element is softened by said heating device said clamp is rotated to advance said element past said heating device in an arc the radius of which is varied by displacement of said carriage.

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## 3,920,436
## ARTIFICIAL PROTECTIVE ENVIRONMENT FOR PLANTS

**Edward W. Janssen, Village of Roseville, Minn., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.**

**Filed Aug. 7, 1972, Ser. No. 278,534**
**Int. Cl.² A01N** *5/00*
**U.S. Cl. 71—65** **12 Claims**

1. A method for providing an artificial protective environment for a plant or portion thereof comprising contacting said plant or portion thereof with a fluid agent comprising a hydrophilic urethane prepolymer of the formula

$$Y_1[(RO)_o - Y_2(NCO)_p]_z$$

where $Y_1$ is an active hydrogen-free residue of a compound having a plurality of active hydrogen atoms, $(RO)_n$ is a hydrophilic polyoxyalkylene chain having a plurality of oxyethylene units, $o$ is the number of oxyalkylene units in said chain, $Y_2$ is an organic linkage bonding said chain to the isocyanate moiety shown in the formula, $p$ is 1 to 5, and $z$ is equal to the number of hydrogen atoms in the compound from which $Y_2$ is derived, and curing said prepolymer in the presence of water to form a thin, discontinuous, water-insoluble, hydrophilic polyurethane-polyurea polymer coating which is adhesively bonded to said plant or portion thereof.

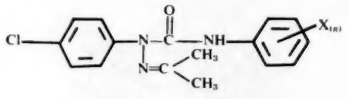
3,920,437

## BIOCIDAL ACTIVE CARBAMYL HYDRAZONES

Don R. Baker, Orinda, Calif., assignor to Stauffer Chemical Company, Westport, Conn.

Division of Ser. No. 339,691, March 9, 1973, Pat. No. 3,829,486. This application Apr. 1, 1974, Ser. No. 456,500
Int. Cl.[2] A01N 9/00
U.S. Cl. 71—67 3 Claims

1. The method of controlling parasites selected from the group consisting of bacteria, fungi and algae by inhibiting the growth thereof comprising contacting the parasites where control is desired with an effective amount of a compound having the following formula



wherein X is chloro and *n* is 1 or 2.

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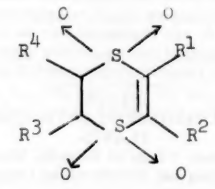
3,920,438

## SUBSTITUTED DITHIN TETROXIDE PLANT GROWTH REGULANTS

Arthur D. Brewer, Guelph, Canada; Robert W. Neidermyer, Carmel, Ind., and William S. McIntire, Senatobia, Miss., assignors to Uniroyal, Inc., New York, N.Y. and Uniroyal Ltd., Quebec, Canada

Filed May 7, 1973, Ser. No. 357,757
Int. Cl.[2] A01N 9/12
U.S. Cl. 71—73 19 Claims

1. A method of aiding in the harvesting of the products of desirable plants comprising applying to the locus thereof, an effective amount of a 2,3-dihydro-1,4-dithiin 1,1,4,4-tetroxide of the formula



wherein $R^1$, $R^2$, $R^3$ and $R^4$ are selected from the group consisting of hydrogen and lower alkyl having one to two carbon atoms, not more than two of the R's being hydrogen, or an adjacent pair of R's are connected together in the form of a chain of three to four methylene groups.

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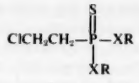
3,920,439

## 2-CHLOROETHYLPHOSPHONOTHIOIC ACIDS AND ESTERS FOR REGULATION OF PLANT GROWTH

David I. Randall, and Robert W. Wynn, both of Easton, Pa., assignors to GAF Corporation, New York, N.Y.

Continuation of Ser. No. 869,915, Oct. 26, 1969, abandoned. This application Jan. 17, 1973, Ser. No. 324,516
Int. Cl.[2] A01N 9/36
U.S. Cl. 71—87 8 Claims

1. A crop yield improving composition comprising an effective amount of a compound of the formula:



wherein X is oxygen or sulfur and R is hydrogen, $C_{1-3}$ alkyl, phenyl optionally substituted by methyl, or benzyl, and a non-phytotoxic carrier therefor.

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3,920,440

## METHOD FOR PROTECTING PLANTS AGAINST OXIDANT INJURY

Ichiro Takaoka; Michio Fukuda; Takuro Kisaki; Hiroshi Kitano; Akira Koiwai; Toshikiyo Shinohara; Kiyotomo Araiba; Toshiaki Kitamura, and Yoshitada Yamamoto, all of Kurashiki, Japan, assignors to Takasago Perfumery Co., Ltd. and The Japan Tabacco & Salt Public Corporation, both of Tokyo, Japan

Filed Aug. 9, 1973, Ser. No. 386,892
Claims priority, application Japan, Aug. 15, 1972, 47-81162
Int. Cl.[2] A01N 9/24
U.S. Cl. 71—88 3 Claims

1. A method of protecting plants against air oxidant injury comprising applying to said plants piperonyl butoxide.

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3,920,441

## SELECTIVE HERBICIDE COMPOSITIONS CONTAINING A SUBSTITUTED TRIAZINE DERIVATIVE AND A BENZO-2-THIA-1,3-DIAZINONE-(4)-2,2-DIOXIDE

Adolf Fischer, Mutterstadt, Germany, assignor to Badische Anilin- & Soda-Fabrik Aktiengesellschaft, Ludwigshafen (Rhine), Germany

Continuation-in-part of Ser. No. 16,567, March 4, 1970, abandoned. This application Feb. 21, 1973, Ser. No. 334,195
Claims priority, application Germany, Mar. 15, 1969, 1913266
Int. Cl.[2] A01N 9/12
U.S. Cl. 71—91 2 Claims

1. A herbicide composition containing a herbicidally effective amount of a mixture consisting essentially of

a. a member selected from the group consisting of 2-ethylamino-4-(1-methyl-3-oxabutyl)amino-6-chloro-1,3,5-triazine, 2-chloro-4-ethylamino-6-isopropylamino-1,3,5-triazine, and 2-(2-chloro-4-ethylamino-1,3,5-triazin-6-ylamino)-2-methylpropionitrile, and

b. a member selected from the group consisting of 3-isopropyl-2,1,3-benzothiadiazinone-(4)-2,2-dioxide or the sodium, dimethylamine, or diethanolamine salt thereof in a weight ratio of compounds a:b in the range of 1:0.2-5, respectively.

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3,920,442

## WATER-DISPERSIBLE PESTICIDE AGGREGATES

Robert Eyer Albert, Wilmington, Del., and Grant Barg Weed, Bountiful, Utah, assignors to E. I. Du Pont de Nemours & Co., Wilminton, Del.

Continuation-in-part of Ser. No. 290,001, Sept. 18, 1972, abandoned, which is a continuation-in-part of Ser. No. 74,190, Sept. 21, 1970, abandoned. This application Apr. 3, 1974, Ser. No. 457,401
Int. Cl.[2] A01N 9/22
U.S. Cl. 71—92 16 Claims

1. A coherent, free-flowing, water dispersible pesticide-containing aggregate that will pass through a U.S. Standard 10 mesh sieve, and will be retained on a U.S. Standard 140 mesh sieve, consisting essentially of from 0 to 90 percent by weight inert fillers, from 5 to 95 percent by weight of a pesticide, and 0.5 to 40 percent by weight of a water-soluble binder-dispersant which has been aggregated in a fluidized bed.

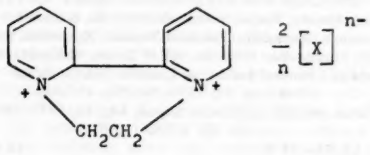
3,920,443

## HERBICIDAL COMPOSITIONS

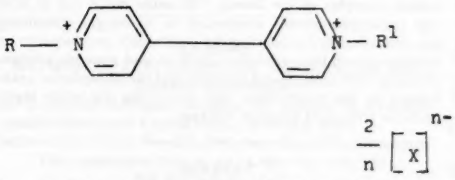
Nigel Wyndham Drewe, Maidstone; Alan Cecil Waters, Tonbridge, and Peter Ernest Giffard, Gillingham, all of England, assignors to Imperial Chemical Industries Limited, London, England

Filed Mar. 23, 1973, Ser. No. 344,086
Claims priority, application United Kingdom, Apr. 13, 1972, 17066/72
Int. Cl.[2] A01N 9/22
U.S. Cl. 71—94 7 Claims

1. A concentrated herbicidal composition, comprising an aqueous solution of a herbicidally effective amount of a salt of a herbicidal bipyridylium quaternary cation selected from the group consisting of compounds of the formula:



and



wherein R and $R^1$ are selected independently from the group consisting of alkyl radicals of from 1 to 4 carbon atoms and alkyl radicals of from 1 to 4 carbon atoms substituted by a radical selected from the group consisting of hydroxy, halogen, carboxyl, lower alkoxy, lower alkylcarbonyl, lower alkoxycarbonyl, carbamoyl and N-lower alkyl substituted carbamoyl; $\{X\}^{n-}$ represents an anion and $n$ is an integer of from 1 to 4 inclusive; together with an effectively warning amount of an odourant comprising an alkyl pyridine, said composition reducing the likelihood of accidental swallowing of said herbicidal salt by virtue of the unpleasant smell of the odourant.

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3,920,444

## METHOD COMPRISING THE USE OF N-SUBSTITUTED PERFLUOROALKYANESULFONAMIDES AS HERBICIDAL AND PLANT GROWTH MODIFYING AGENTS, AND COMPOSITION

Joseph Kenneth Harrington, Edina; Donald C. Kvam, North Oaks; Arthur Mendel, Vadnais Heights, and Jerry E. Robertson, North Oaks, all of Minn., assignors to Minnesota Mining and Manufacturing Co., St. Paul, Minn.

Continuation-in-part of Ser. No. 100,404, Dec. 21, 1970, abandoned, which is a division of Ser. No. 832,829, June 12, 1969, Pat. No. 3,639,474, which is a continuation-in-part of Ser. No. 588,338, Oct. 21, 1966, abandoned. This application Apr. 19, 1973, Ser. No. 352,596
Int. Cl.[2] A01N 9/16
U.S. Cl. 71—103 6 Claims

1. The method for modifying the growth of sugar cane which comprises contacting sugar cane plants with an effective amount of 5-acetamido-2-methyltrifluoromethanesulfonanilide, or an alkali metal, alkaline earth metal, alkyl amine, dialkanolamine, ammonium, zinc, iron or aluminum salt thereof thereby increasing the yield of sugar upon harvest.

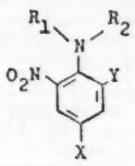
3,920,445

## SUBSTITUTED 6-NITROANILINE COMPOUNDS AND HERBICIDAL COMPOSITIONS

Klaus Wagner; Ludwig Eue, both of Cologne, and Erich Klauke, Odenthal, all of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

Division of Ser. No. 114,071, Feb. 9, 1971, Pat. No. 3,781,323. This application July 6, 1973, Ser. No. 376,991
Claims priority, application Germany, Feb. 28, 1970, 2009497
Int. Cl.[2] A01N 9/20
U.S. Cl. 71—105 8 Claims

1. Herbicidal compositions comprising a herbicidally acceptable carrier and, as an active compound an effective amount of, a 6-nitroaniline compound of the general formula



in which

$R_1$ is hydrogen, alkyl of from 1 to 4 carbon atoms, hydroxyalkyl of from 1 to 4 carbon atoms, or alkoxyalkyl of from 1 to 4 carbon atoms in each of the alkyl or alkoxy moieties, alkenyl of from 2 to 4 carbon atoms, cycloalkyl of from 5 to 6 carbon atoms, aralkyl of from 1 to 2 carbon atoms or unsubstituted or substituted phenyl;

$R_2$ is hydrogen or alkyl or alkenyl of up to 4 carbon atoms; and

X and Y are selected from the group consisting of trifluoromethyl and cyano with the proviso that one of X and Y is trifluoromethyl and the other cyano.

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3,920,446

## METHODS OF TREATING SILICIOUS MATERIALS TO FORM SILICON CARBIDE FOR USE IN REFINING FERROUS MATERIAL

Meherwan C. Irani, Pittsburgh, Pa., assignor to Eugene F. Buell, Pittsburgh, Pa., a part interest

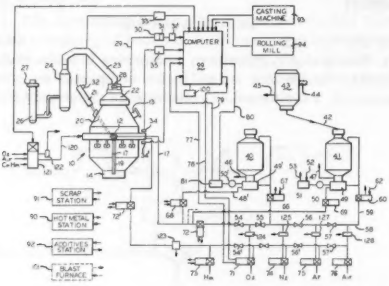
Continuation-in-part of Ser. No. 855,766, Sept. 5, 1969, Pat. No. 3,836,356, which is a continuation-in-part of Ser. No. 764,041, Sept. 26, 1968, abandoned. This application Apr. 24, 1974, Ser. No. 463,658
Int. Cl.[2] C21C 7/00
U.S. Cl. 75—51 11 Claims

1. A process for ferrous metal refining comprising the steps of mixing silicious material containing oxygen bearing silicon compounds and oxygen compounds of iron with at least a stoichimetric amount of carbon to combine with the oxygen bearing silicon compounds in the material to form silicon carbide and reduce oxygen compounds of iron to the metallic state, heating the mixture in a first vessel in a nonoxidizing atmosphere to a temperature in excess of 2500°F., holding the temperature till there is no further reaction between the oxygen bearing silicon compounds and carbon, removing the resulting product from said first vessel, adding the resulting product to molten ferrous metal in a second vessel, adding ferrous scrap and lime for slag formation to the molten metal, injecting high velocity jets of oxygen gas onto the surface of the molten ferrous metal till the silicon and carbon contents of the molten ferrous metal have attained the desired level, adding ferrous material to the molten iron in an amount sufficient to maintain the desired ferrous metal pouring temperature, separating the molten slag from the molten ferrous metal and pouring the resulting molten ferrous metal into molds, to convert the molten ferrous metal into solid forms.

## 3,920,447
## STEEL PRODUCTION METHOD

David L. Schroeder; Jai K. Pearce, and Eberhard G. Schempp, all of Pittsburgh, Pa., assignors to Pennsylvania Engineering Corporation, Pittsburgh, Pa.

Filed Feb. 28, 1972, Ser. No. 229,958
Int. Cl. C21c 5/34
U.S. Cl. 75—60 9 Claims




1. A method of treating metal contained in a metallurgical vessel having tuyere means for delivering gases beneath the level of said metal and a gas discharge opening, said tuyere means including a first tuyere passage and a second tuyere passage surrounding said first tuyere passage, the steps of:

charging said vessel with a quantity of scrap metal while simultaneously delivering an inert gas to said vessel through said first and second tuyere passages,

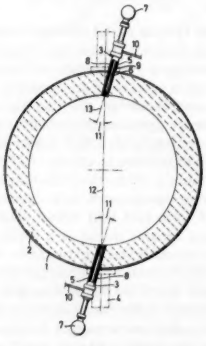
terminating the delivery of said inert gas, and

simultaneously delivering to said vessel an oxygen containing gas through one of said tuyere passages and a fuel through the other to thereby produce heat for preheating said scrap metal.

## 3,920,448
## PROCESS AND CONVERTER FOR REFINING LIQUID METALS

Helmut Knuppel; Karl Brotzmann, and Hans Georg Fassbinder, all of Sulzbach-Rosenberg, Germany, assignors to Eisenwerk-Gesellschaft Maximilianshutte mbH, Sulzbach-Rosenberg, Germany

Filed Oct. 2, 1973, Ser. No. 402,695
Claims priority, application Canada, Oct. 3, 1972, 153166
Int. Cl. C21c 5/34
U.S. Cl. 75—60 6 Claims



1. In a process for refining molten metal in a refractory, masonry lined refining vessel with a nearly circular horizontal cross section wherein a stream of oxygen gas surrounded by a separate stream of fluid hydrocarbons is introduced into the molten metal underneath the bath surface, through at least one tuyere which includes an inner pipe for the oxygen and an outer pipe concentric with the inner pipe, the space between said pipes being for the introduction of said fluid hydrocarbons, the improvement which comprises:

introducing the oxygen and hydrocarbons through at least one pair of opposed tuyeres in order to achieve the desired control of bath motion, said tuyeres being located in the lateral side wall of said refining vessel and being arranged so that the angle between each tuyere and a diameter connecting the discharge ends of each pair of tuyeres does not exceed 20°.

## 3,920,449
## PROCESS FOR RECOVERING NOBLE METAL

Takeru Onoda, Tokyo; Yoshitoshi Tsunoda, Kurashiki; Takao Nomura, Kurashiki; Takehisa Nonaka, Kurashiki, and Tetsuo Masuyama, Machida, all of Japan, assignors to Mitsubishi Chemical Industries Limited, Tokyo, Japan

Filed Aug. 14, 1974, Ser. No. 497,414
Claims priority, application Japan, Aug. 14, 1973, 48-91054
Int. Cl.[2] C22B 11/00
U.S. Cl. 75—97 R 10 Claims

1. A process for recovering a Group VIII noble metal comprising combusting an organic solvent solution containing a soluble complex of the Group VIII noble metal and at least one organophosphorus compound in an oxygen-containing gas, immediately introducing the combustion product into an aqueous absorbing solution to catch in said aqueous solution of Group VIII noble metal particles and the phosphorus oxide formed by the combustion, and recovering the noble metal particles from said aqueous solution.

## 3,920,450
## SOLVENT EXTRACTION OF In AND/OR Ga

Tetsuo Katsura, Koganei, and Hideki Abe, Kosaka, both of Japan, assignors to The Dowa Mining Co., Ltd., Tokyo, Japan

Filed Oct. 18, 1974, Ser. No. 515,844
Int. Cl.[2] C22B 58/00; C01G 15/00
U.S. Cl. 75—101 BE 12 Claims

1. A method of recovering metal values from a solution containing at least one element selected from gallium and indium, which comprises contacting said solution with a cation exchange solvent of a tertiary saturated aliphatic acid dissolved in a water-insoluble diluent to extract the element into the organic solvent, separating the organic solvent from the resulting extraction mixture, and contacting the separated organic solvent with an aqueous solution of a mineral acid to extract the element therefrom.

## 3,920,451
## WELL WORKABLE, ABRASION RESISTANT NODULAR CAST IRON AND A METHOD OF ITS PRODUCTION

Adam Gierek, Katowice; Franciszek Binczyk, Siemianowice Slaskie, and Andrzej Bylica, Gliwice, all of Poland, assignors to Politechnika Slaska Im. Wincentega Pstrowskiego, Gliwice, Poland

Filed Feb. 15, 1974, Ser. No. 443,039
Claims priority, application Poland, Apr. 27, 1973, 162215
Int. Cl. C22c 33/00, 39/14
U.S. Cl. 75—130 R 5 Claims

1. An easily machinable, abrasion resistant nodular cast iron consisting of

2.6 to 2.8 % C; 4.0 to 4.5 % Si; 0.1 to 0.2 % Mn; 0.15 to 0.25 % Cr; 0.03 to 0.06 % S; 0.05 to 0.08 % P,

the balance being iron, said cast iron having a structure consisting of a metal matrix in the form of silicon ferrite, nodular spherulites of graphite, and carbon bonded in the form of eutectic and hypereutectic alloy cementite, the perlite content in the structure being not more than about 3 %.

## 3,920,452
## LIGHT-DUTY ELECTRICAL CONTACTS

**Terrence Ardern Davies, Northampton, England, assignor to Square D Company, Park Ridge, Ill.**

**Division of Ser. No. 191,564, Oct. 21, 1971, Pat. No. 3,778,257. This application June 25, 1973, Ser. No. 373,054**
**Claims priority, application United Kingdom, Oct. 21, 1970, 49960/70**
**Int. Cl.[2] B22F** *1/00, 5/00*
**U.S. Cl. 75—200** **9 Claims**

3. A method as claimed in claim 2 wherein the compacted shape is compacted at a pressure of 10 tons per square inch, and wherein the simultaneous sintering and the surface and internal oxidizing is effected at a temperature of 930°C for a period of time of one hour.

7. A method of producing a light-duty electrical contact including the steps of mixing fine, irregular silver powder with ultra fine ruthenium metal powder to provide a mixture having a fine, evenly dispersed ruthenium content in the range 0.1 to 10.0 atomic per cent; compacting the mixture into a desired shape; heating the compacted shape in an inert or reducing atmosphere for a period of time to effect sintering of same; surface and internally oxidizing the sintered compacts to convert the ruthenium metal into ruthenium dioxide; and pressure stamping the compacts to increase the density thereof.

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## 3,920,453
## METHOD OF ELECTROSTATIC DUPLICATING BY IMAGE TRANSFER

**Earl L. Gasner, Arlington Heights, Ill., assignor to Addressograph-Multigraph Corporation, Cleveland, Ohio**

**Continuation of Ser. No. 221,500, Jan. 28, 1972, abandoned. This application May 6, 1974, Ser. No. 466,935**
**Int. Cl.[2] G03G** *13/22*
**U.S. Cl. 96—1.4** **8 Claims**

1. The process of making reproductions from a reusable photoconductive medium comprising the steps of:

a. forming a photoconductive medium consisting essentially of a conductive base support carrying thereon an organic photoconductive layer and a resistive current limiting layer containing a film-forming material selected from the group consisting of methyl cellulose, polyurea, hydroxypropyl methyl cellulose, ethylacrylate-acrylic acid-styrene terpolymer, copolymer of methyl vinyl ether and maleic anhydride and polyvinyl alcohol, said current-limiting layer having a thickness of from about 2 to about 50 microns in contact with said photoconductive layer, the resistivity of said resistive layer being in the range of $10^8$ to $10^{12}$ ohm-centimeters;

b. applying a blanket electrostatic charge to the photoconductive medium by means of a charging electrode;

c. exposing the charged layer to a pattern of light and shadow to produce a charge image thereon;

d. developing the charge image by applying an electroscopic powder therein while imposing a potential gradient between said conductive base and the electroscopic powder by means of a biasing potential;

e. transferring the powder image to a receiving member under the influence of a transfer electrode;

f. establishing a reference potential for the electrodes in steps (b), (d), and (e), by providing a reference electrode;

g. repeating at least once the steps (b) through (f); whereby loss in the biasing potential at said developing step is prevented by said resistive layer interrupting the direct connection of said photoconductive layer to said reference electrode in the event of any discontinuity in said photoconductive layer.

2. The process of successively developing and transferring a powder image from an electrophotographic member bearing a latent electrostatic image with an electroscopic powder by means of a magnetic brush developer comprising the steps of:

a. forming a photoconductive medium comprising a conductive base support carrying thereon an organic photoconductive layer and a resistive layer containing a film forming material selected from the group consisting of methyl cellulose, polyurea, hydroxypropyl methyl cellulose, ethylacrylate-acrylic acid-styrene terpolymer, copolymer of methyl vinyl ether and maleic anhydride and polyvinyl alcohol, said resistive layer having a resistivity in the range of $10^8$ to $10^{12}$ ohm-centimeters and having a thickness in the range of 2 to 50 microns in contact with said photoconductive layer;

b. connecting said conductive base support to a reference electrode;

c. applying a biasing potential to said magnetic brush thereby establishing a potential gradient between said conductive base and said electroscopic powder; whereby any loss in said biasing potential is prevented by said resistive layer interrupting the direct connection of said photoconductive layer to said reference electrode in the event of any discontinuities in said photoconductive layer;

d. and thereafter developing the charge image by applying said electroscopic powder thereon;

e. and transferring the powder image to a receiving member under the influence of a transfer electrode; and

f. repeating at least once the steps (c) through (e).

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## 3,920,454
## FABRICATION OF IRON OXIDE PATTERN

**Larry Flack Thompson, Gillette, N.J., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.**

**Filed May 9, 1973, Ser. No. 358,728**
**Int. Cl. G03c** *5/00*
**U.S. Cl. 96—36** **5 Claims**

1. Procedure for the fabrication of an article including a film comprising at least one oxidized iron compound on a substrate characterized in that the said procedure includes procedural steps in which the said substrate is wetted by a solvent solution consisting essentially of a polymerized product, the said polymerized product consisting essentially of at least one addition polymer having a molecular weight of at least 3,000 Mv of a monomer, said monomer consisting essentially of two five-membered rings containing a $\pi$-bonded iron atom, the said rings including as a substituent a mono-olefinic hydrocarbon side chain, any further substituents being saturated;

removing solvent thereby leaving a residuum consisting essentially of a continuous layer of dried polymer product;

oxidizing the said layer so as to convert substantially all of the dried polymer product thereby producing a film comprising at least one compound consisting of an oxide of iron, said procedure including a procedural step resulting in patterning of the said film, in which patterning results from removal of a portion of the said film, and in which removal is by selective etching of a portion of the said film involving the imposition of a patterned resist film, in which the portion of the said film removed by selective etching corresponds with voids in the said patterned resist film and in which the entire composite surface including bared film and resist film is subjected to an etchant.

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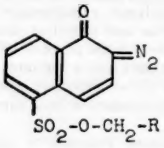
## 3,920,455
## LIGHT-SENSITIVE COMPOSITIONS AND MATERIALS WITH O-NAPHTHOQUINONE DIAZIDE SULFONYL ESTERS

**Albert S. Deutsch, and Joseph M. Poppo, both of Yonkers, N.Y., assignors to Polychrome Corporation, Yonkers, N.Y.**

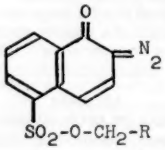
**Division of Ser. No. 148,238, May 28, 1971, Pat. No. 3,823,130. This application Nov. 7, 1973, Ser. No. 413,536**
**Int. Cl.[2] G03F** *7/08*; **G03C** *1/54*
**U.S. Cl. 96—75** **10 Claims**

1. A light-sensitive composition comprising a mixture of about 0.1 to about 10 parts by weight of an alkali-soluble

hydroxyaryl-aldehyde resin, a styrene-maleic anhydride copolymer resin or a mixture thereof, per part by weight of a light-sensitive compound of the formula



wherein R is cyclohexyl ,—$C(CH_3)_2$, or —$C(CH_3)_3$ carbon atoms substituted at the alpha-position by methyl or dimethyl. 5. A light-sensitive article adapted to be exposed to light and developed to form a lithographic printing plate which comprises a base sheet having a coating thereon of a light-sensitive compound of the formula



wherein R is cyclohexyl ,—$C(CH_3)_2$, or —$C(CH_3)_3$ atoms substituted at the alpha-position by methyl or dimethyl.

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**3,920,456**

## PHOTOGRAPHIC ELEMENTS CONTAINING A MATT LAYER

**Fritz Nittel, Cologne; Karl Lohmer, and Helmut Kolberg, both of Leverkusen, all of Germany, assignors to AGFA-Gevaert Aktiengesellschaft, Leverkusen-Bayerwerk, Germany, DT**

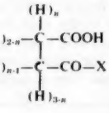
**Filed May 31, 1974, Ser. No. 475,197**

**Claims priority, application Germany, June 6, 1973, 2328781**

**Int. Cl.² G03C** *1/78, 1/96, 1/76*

**U.S. Cl. 96—87 R** **3 Claims**

**1.** A photographic material comprising a light-sensitive composition layer on a photographic support and having at least one matt layer which contains in a hydrophilic binder finely distributed particles consisting of particles of anhydrous silica enveloped in a hydrophilic oil forming agent of the formula:



wherein

R represents alkyl or alkenyl containing 12 to 20 carbon atoms,

$n = 1$ or 2,

$X = -OR_1$ or $-NR_1R_2$,

$R_1$ represents hydrogen, alkyl, cycloalkyl, aralkyl, aryl or a 5-membered or 6-membered heterocyclic group;

$R_2$ = represents a group as defined under $R_1$ or a hydroxyl group, an amino group or an acylamino group;

$R_1$ and $R_2$ may together represent the ring members required for completing a 5-membered or 6-membered ring which contains at least one nitrogen atom.

**3,920,457**

## PHOTOGRAPHIC LEUCO-DYE COMPOSITIONS CONTAINING REDUCTONES AS STABILIZERS

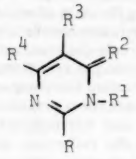
**Michael Paul Cunningham; William Charles Farley, and Richard Cornelius Van Hanehem, all of Rochester, N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.**

**Filed Mar. 4, 1974, Ser. No. 448,177**

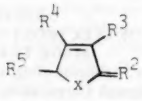
**Int. Cl.² G03C** *1/52*

**U.S. Cl. 96—90 R** **8 Claims**

**1.** In combination with a leuco dye-containing photographic element which prints out to form an image upon exposure to radiation, a photooxidizer the improvement which comprises a stabilizer selected from the group consisting of reductones of the structure:



and



wherein $x$ is oxygen or alkylene having 1 or 2 carbon atoms, R and $R^1$ are independently selected from the group consisting of hydrogen and alkyl, $R^2$ is oxygen or an imino group, $R^3$ and $R^4$ are independently selected hydroxyl or amino groups, but at least one of $R^3$ and $R^4$ must be hydroxyl, $R^5$ is aryl, aryl substituted with alkyl, carboxyl or alkoxycarbonyl, or

wherein $R^6$ and $R^7$ are independently selected alkyl groups

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**3,920,458**

## PHOTOGRAPHIC SENSITIVE MATERIAL SUITABLE FOR THE SILVER-DYESTUFF BLEACHING METHOD

**Keisuke Shiba, and Masanao Hinata, both of Minami-ashigara, Japan, assignors to Fuji Photo Film Co., Ltd., Japan**

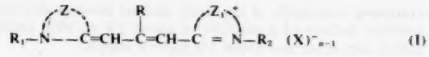
**Continuation of Ser. No. 184,585, Sept. 28, 1971, abandoned. This application Nov. 2, 1973, Ser. No. 412,521**

**Claims priority, application Japan, Sept. 28, 1970, 45-84534**

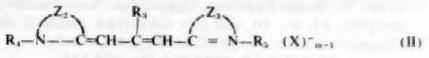
**Int. Cl.² G03C** *1/10*

**U.S. Cl. 96—99** **8 Claims**

**1.** In a photographic sensitive material having at least one red sensitive silver halide emulsion layer containing cyan azo dyestuffs suitable for the silver-dyestuff bleaching method, the improvement which comprises a combination of at least one of sensitizing dyestuffs of the following general Formula (I) and at least one of sensitizing dyestuffs of the following general Formula (II):



wherein Z represents a non-metallic atomic grouping required for the completion of a naphthothiazole or naphthoselenazole ring, $Z_1$ represents a non-metallic atomic grouping required for the completion of a naphthothiazole, benzothiazole, naphthoselenazole or benzoselenazole ring, R represents a member selected from the first group consisting of a hydrogen atom, lower alkyl or aryl radical, $R_1$ and $R_2$ each represents an alkyl radical and at least one of said $R_1$ and $R_2$ is an alkyl radical containing a carboxyl or sulfo group, X represents an anion, $n$ is 1 or 2, and $n-1$ if an intermolecular salt is formed;



wherein $Z_2$ and $Z_3$, which may be identical or different, each represents a non-metallic atomic grouping required for the completion of a benzothiazole or benzoselenazole ring, $R_3$ represents a member selected from the second group consisting of a hydrogen atom, lower alkyl or aryl radical, $R_4$ and $R_5$ having the same meanings as $R_1$ and $R_2$ and at least one of said $R_4$ and $R_5$ is an alkyl radical containing a carboxyl or sulfo group, X represents an anion, $m$ is 1 or 2, and $m=1$ if an intermolecular salt is formed.

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**3,920,459**

## FLAMEPROOF COMPOSITIONS

**Barrington T. Allen, Portland, Oreg., assignor to Crown Zellerbach Corporation, San Francisco, Calif.**

**Filed Sept. 9, 1974, Ser. No. 504,631**
**Int. Cl.² C08G** *6/00*
**U.S. Cl. 106—15 FP** **10 Claims**

**1.** A flameproof composition of synthetic, organic polymer fibers and inherently flammable material in a weight ratio of from about 1:9 to about 4:1, the polymer fibers containing from about 10% to 75% by weight of a flame retardant system comprising organically-bonded chlorine or bromine atoms and a first additive which acts synergistically with the chlorine or bromine atoms in providing flame retardancy, the weight ratio of the halogen atoms to the synergistically-acting compound being from about 1:1 to about 7:1, and the composition having deposited on the surface thereof a second additive which acts synergistically with the chlorine or bromine atoms in providing flame retardancy, the second additive being present in an amount of from about 0.1% to 20% by weight based on the weight of the composition.

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**3,920,460**

## PROCESS FOR PRODUCING A BONDED PARTICULATE MATERIAL

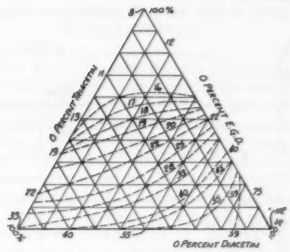
**Frank J. Boston, Madison Drive, and Victor W. Nery, Manor Drive, both of Columbiana, Ohio 44408**

**Continuation-in-part of Ser. No. 361,009, May 16, 1973, abandoned, which is a continuation-in-part of Ser. No. 191,910, Oct. 22, 1971, abandoned. This application Jan. 2, 1974, Ser. No. 430,148**
**Int. Cl. B28b** *7/34*
**U.S. Cl. 106—38.3** **5 Claims**

**1.** In a process for producing a bondable particulate material for foundry use comprising the steps of mixing with the particulate material a binder comprising an aqueous alkali metal silicate having an $SiO_2$ to alkali metal oxide ratio in the range of 1.4:1 to 3.3:1, the improvement comprising the steps of

initially heating the particulate material above 70° F. and

adding to the mixture as a predeterminable set time additive a selective amount of a catalytic agent consisting in combination by weight of the ingredients, 10% to 60% diacetin, 10% to 85% triacetin and 20% to 40% ethylene glycol diacetate, the selected amount of catalytic agent being within the range of 5% to 15% by weight to the binder weight,




the percentage selection of said ingredients dependent upon the desired period of setting time and the temperature level of the particulate material.

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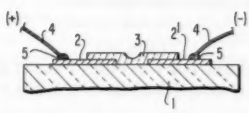
**3,920,461**

## GLASS MATERIAL HAVING A SWITCHING EFFECT

**Yoshiyuki Asahara, Kawasaki; Tetsuro Izumitani, Hino, and Hidemi Tajima, Akihima, all of Japan, assignors to Hoya Glass Works, Ltd., Tokyo, Japan**

**Filed July 30, 1973, Ser. No. 383,742**
**Claims priority, application Japan, Aug. 22, 1972, 47-83858**
**Int. Cl.² C03C** *3/00*
**U.S. Cl. 106—47 R** **6 Claims**




**1.** A glass material having a memory type or threshold type switching effect, which consists of 14.0–35.0 atomic % of Ge, 20.0–30.0 atomic % of As, 5.0–25.0 atomic % of Se and 25.0–55.0 atomic % of Te.

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**3,920,462**

## THERMALLY OPACIFIABLE GLASSES

**James E. Flannery, and Dale R. Wexell, both of Corning, N.Y., assignors to Corning Glass Works, Corning, N.Y.**

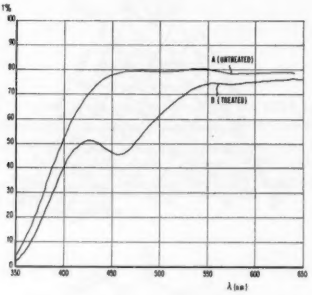
**Filed Feb. 4, 1974, Ser. No. 439,077**
**Int. Cl.² C03C** *3/04, 3/10*
**U.S. Cl. 106—52** **6 Claims**

**1.** An essentially lead-free, $B_2O_3$-free thermally opacified glass, wherein crystals selected from the group consisting of sodium molybdate, sodium tungstate, barium molybdate, barium tungstate, and mixtures thereof constitute the predominant opacifying phase, said glass consisting essentially, by weight on the oxide basis, of about 64–80% $SiO_2$, 2–12% $Al_2O_3$, 9–16% $R_2O$, wherein $R_2O$ consists of 9–15% $Na_2O$ and 0–5% $K_2O$, 1.2–4% $RO_3$, wherein $RO_3$ consists of 1.2–4% $MoO_3$ or 1.6–4% $WO_3$ or mixtures thereof in amounts at least equivalent to 1.2% $MoO_3$, 0.5–3% F, and 0–4% BaO.

## 3,920,463
## PROCESS FOR CHANGING THE TINT OF A PHOTOCHROMIC MATERIAL AND MATERIAL FORMED THEREBY

**Robert A. Simms, 449 Ithaca Road, Horseheads, N.Y. 14845**

**Filed Feb. 1, 1974, Ser. No. 438,835**
**Int. Cl.[2] C03C** *23/00*
**U.S. Cl. 106—54** **15 Claims**




**1.** A process for permanently changing the tint of a photochromic inorganic bore silicate glass article containing submicroscopic particles of silver halide, without adverse effect on the photochromic properties thereof, which comprises heating the photochromic glass article at a temperature of at least about 300°C to about 600°C for from about 4 minutes to about 15 minutes in a gaseous reducing atmosphere having a free energy of formation greater than about 1 ½ to about 2 electron volts; and then prior to substantial cooling of said article

subjecting said article while at an elevated temperature to ultraviolet irradiation,

said heating in a gaseous reducing atmosphere imparting an initial tint to the photochromic article and said subjecting to ultraviolet irradiation being at a time and temperature sufficient to deepen said initial tint.

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## 3,920,464
## REFRACTORY BONDING SYSTEM

**John Damiano, Linden, N.J., assignor to Quigley Co., Inc., New York, N.Y.**

**Filed Oct. 21, 1974, Ser. No. 516,276**
**Int. Cl.[2] C04B** *35/04, 35/06*
**U.S. Cl. 106—58** **8 Claims**

**1.** A quick-setting refractory composition consisting essentially of at least about 85 weight percent particulate basic refractory, from about 0.5 to 3 weight percent finely divided active calcium oxide, from about 2.5 to 5 weight percent glassy alkali metal or ammonium polyphosphate and from about 1.5 to 4 weight percent preformed finely divided dibasic calcium phosphate.

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## 3,920,465
## GYPSUM SET ACCELERATOR

**Edward A. Burkard, East Amherst, and Donald A. Kossuth, Buffalo, both of N.Y., assignors to National Gypsum Company, Buffalo, N.Y.**

**Division of Ser. No. 358,191, May 7, 1973, Pat. No. 3,870,538. This application Oct. 15, 1974, Ser. No. 514,455**
**Int. Cl.[2] C04B** *11/22*
**U.S. Cl. 106—114** **4 Claims**

**1.** A wallboard core formulation comprising a major portion of calcium sulfate hemi-hydrate and a minor portion of fiber reinforcement, water of hydration, means for lowering the density and an accelerator for accelerating the setting reaction of calcium sulfate hemi-hydrate and water, said accelerator consisting essentially of the finely ground product of a compression milling of a mixture of about 1% to 99% calcium sulfate dihydrate and about 1% to 99% starch.

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## 3,920,466
## BINDER FOR CEMENTING WELLS

**Solomon Isaakovich Danjushevsky, Ploschad Chernyshevskogo 7, kv. 79; Rakhil Izrailevna Liogonkaya, Novo-Izmailovsky prospekt, 53, kv. 10, and Lev Girshovich Sudakas, ulitsa Shelgunova, 15, kv. 6, all of, Leningrad, U.S.S.R.**

**Filed July 12, 1973, Ser. No. 378,638**
**Int. Cl.[2] C04B** *7/14*
**U.S. Cl. 106—117** **2 Claims**

**1.** A binder for cementing wells at a temperature of 100° to 200°C and under a pressure not over 1000 atm which consists essentially of blast-furnace slag and between 5 and 10wt. % of magnesium oxide having a refractive index between 1.722 and 1.734.

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## 3,920,467
## CHEMICAL MODIFICATION OF ASPHALT TO IMPROVE DURABILITY

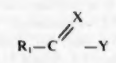
**William T. Stewart, and Robert J. Schmidt, both of El Cerrito, Calif., assignors to Chevron Research Company, San Francisco, Calif.**

**Filed May 22, 1969, Ser. No. 827,066**
**Int. Cl.[2] C08L** *95/00*; **C09D** *3/24*; **C10C** *1/20*; **C08L** *91/00*
**U.S. Cl. 106—273** **9 Claims**

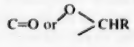
**1.** A method for enhancing the durability of asphalt containing non-hydrogen bonded hydroxyl groups measured by infrared absorption at a frequency in the range of 3,600–3,650 $cm^{-1}$ which comprises treating the asphalt under substantially oxygen-free and anhydrous conditions, by intimately mixing a modifying compound with the entire asphalt mass at a temperature of from about 150° to 650°F and for a time sufficient to reduce the concentration of non-hydrogen bonded hydroxyl in the asphalt measured by infrared absorption at a frequency in the range of 3,600–3,650 $cm^{-1}$, said modifying compound being selected from the group consisting of:

a. R—NCO, in which R is hydrocarbyl of 1 to 24 carbon atoms;

b.



in which $R_1$ is H or R; X is O, S, or $(-H)_2$ when Y is Cl, Br, or I; X is




when Y is H; and X is O or S when Y is O-acyl wherein said acyl group is a hydrocarbyl acyl of 1 to 20 carbon atoms from a monocarboxylic oxygen or sulfur acid, with the proviso that when the compound to be employed is

in which X is $(-H)_2$ and Y is Cl, Br, or I, the asphalt, prior to the addition of the modifying compound is reacted with an alkali metal in an amount sufficient to convert the non-hydrogen bonded phenolic hydroxyl groups to alkali metal phenoxide groups, with the further proviso that when the reaction produces hydrogen halide, sufficient base be present in the reaction mixture to substantially neutralize said hydrogen halide; and

c. ethylene oxide,

with the proviso that when the modifying compound is an alkylene oxide, the treatment is effected in the absence of alkali metals.

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**3,920,468**

## ELECTRODEPOSITION OF FILMS OF PARTICLES ON CATHODES

**Henry Brown, Sarasota, Fla., and Thaddeus W. Tomaszewski, Dearborn, Mich., assignors to Oxy Metal Industries Corporation, Warren, Mich.**

**Division of Ser. No. 834,901, June 19, 1969, Pat. No. 3,687,824. This application June 26, 1972, Ser. No. 266,102**

**Int. Cl.² C08J** *3/06*; **C08L** *23/00*, *77/00*; **C09D** *1/00*

**U.S. Cl. 106—286** **8 Claims**

1. A bath for cathodically electrodepositing films of fine particles, which comprises at least one water-insoluble powder having a particle size in the range of from about 0.01 to 10 microns and being present in amount ranging from about 1 to 150 g/l dispersed in a aqueous solution of about 30 to about 100 g/l of salts of monovalent cations selected from the class of the alkali metal cations and the ammonium cation, said solution being free of ions that can be electroplated.

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**3,920,469**

## SURFACE-TREATED PIGMENTS

**Jean Andre Paul Kienzle; Michel Ernest Antoine Huille, both of Creil, and Louis Antoine Cabut, Nogent, all of France, assignors to Produits Chimiques Ugine Kuhlmann, Paris, France**

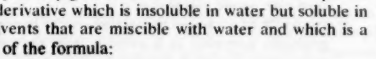
**Filed Apr. 11, 1973, Ser. No. 350,227**

**Claims priority, application France, Apr. 12, 1972, 72.12712**

**Int. Cl. C08h** *17/14*

**U.S. Cl. 106—288 Q** **5 Claims**

1. Phthalocyanine pigment composition intended for the colouration of printing ink in which the elementary particles of phthalocyanine pigments are coated with a film of a phthalocyanine derivative which is insoluble in water but soluble in organic solvents that are miscible with water and which is a compound of the formula:



(I)

in which R represents an alkyl group having 8 to 18 carbon atoms, Pc represents the residue of a metalliferous or nonmetallised phthalocyanine, X represents a divalent group $-SO_2N-H-(CH_2)_n-NH-$, $-CH_2NH-(CH_2)_n-NH-$(wherein $n$ represents 2 or 3), $-SO_2-O-$aryl, $-CH_2-$aryl, and $m$ represents a number from 2 to 4.

**3,920,470**

## COMPOSITION BASED ON BITUMEN AND A FILLER

**Olivier Bertrand, Gaurain Ramecroix, Belgium, assignor to Societe Generale des Ciments Portland de l'Escaut, Antoing, Belgium**

**Division of Ser. No. 355,029, April 27, 1973, abandoned. This application Aug. 20, 1974, Ser. No. 498,923**

**Claims priority, application Belgium, May 5, 1972, 117203**

**Int. Cl.² C09C** *1/28*

**U.S. Cl. 106—288 B** **5 Claims**

1. A filler for admixture with bitumen for paving roads and the like, said filler having a high capacity for absorbing bitumen and a low sensitivity to water when bitumen is mixed with and absorbed therein, said filler comprising a natural mineral filler material containing at least 50 percent of silica, 20 to 80 percent of said silica being in the form of at least one of the group consisting of opal and chalcedony, said filler having a fineness at which at least 82 percent will pass through a 74 micronmesh screen and having been subjected to a heat treatment at a temperature between 100° C. and 800° C.

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**3,920,471**

## PREVENTION OF ALUMINUM ETCHING DURING SILOX PHOTOSHAPING

**Robert K. Jones, Lake Villa, and Murad A. Meneshian, Glenview, both of Ill., assignors to Teletype Corporation, Skokie, Ill.**

**Filed Oct. 10, 1974, Ser. No. 513,908**

**Int. Cl.² H01L** *21/302*

**U.S. Cl. 134—3** **12 Claims**

1. An improved process of the type wherein an article having a first layer, etchable with HF, on a second metal layer is treated by first contacting the first layer with an etchant consisting essentially of an aqueous solution of HF and $NH_4F$, and wherein the etchant after etching away the first layer passivates the second layer by forming a highly insoluble fluoride of the metal thereon, and the article is then rinsed, the improvement comprising:

before the water rinse step, contacting the passivated layer with a substantially HF-free aqueous solution consisting essentially of $NH_4F$ to prevent deterioration of the passivated layer.

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**3,920,472**

## DECAL REMOVAL METHOD

**James H. Vinson, Philadelphia, Pa., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.**

**Filed Nov. 29, 1974, Ser. No. 528,114**

**Int. Cl.² B08B** *3/08*

**U.S. Cl. 134—6** **2 Claims**

1. A method of removing a decal attached to a painted surface with a resin based adhesive comprising:

scuffing said decal without destroying the painted surface; and

contacting said decal, for a period sufficient to loosen said adhesive, with a stripper composition comprising, on a volume basis,

| | |
|---|---|
| xylene | 54–58% |
| mineral spirits | 10.5–11.5% |
| methyl isobutyl ketone | 32–34% |

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**3,920,473**

## BATTERY PLATE GRIDS FOR LEAD-ACID BATTERIES

**Ronald Ian Sims, Solihull, England, assignor to Joseph Lucas (Batteries) Limited, Birmingham, England**

**Continuation of Ser. No. 315,402, Dec. 15, 1972, abandoned. This application Oct. 4, 1974, Ser. No. 512,309**

**Claims priority, application United Kingdom, Dec. 15, 1971, 58165/71**

**Int. Cl.[2] H01M** *35/04*

**U.S. Cl. 136—65** **4 Claims**

1. An alloy for use in the manufacture of battery plate grids for lead-acid batteries, the alloy consisting essentially of, by weight:

| | | |
|---|---|---|
| Calcium | 0.05% | – 0.12% |
| Aluminium | 0.005% | – 0.1% |
| Lead | remainder. | |

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**3,920,474**

## METHOD OF OPERATING A FUEL CELL USING SULFIDE FUEL

**Ralph Zito, Jr., Westford, and Lawrence J. Kunz, Jr., Fitchburg, both of Mass., assignors to General Engineering Laboratories, Inc., Westford, Mass.**

**Filed May 25, 1972, Ser. No. 256,924**

**Int. Cl. H01m** *31/00, 27/04, 27/30*

**U.S. Cl. 136—86 E** **9 Claims**

1. A method of operating fuel cell including an anode and cathode containing graphite-plastic conductive substrates coated with active carbon particles, an anolyte and catholyte compartment and ion exchange means interconnecting said anolyte and catholyte compartments, said anolyte comprising a liquid source of monosulfide ion in a concentration in excess of one normal during a portion of electrochemical cycling, said catholyte comprising a liquid oxidizing agent, comprising the steps of flowing said anolyte into and out of said anolyte compartment at a rate and concentration to maintain sulfide ions in excess of polarization preventing concentration to dissolve free sulfur formed in the course of electrochemical action of the cell and flowing said catholyte into and out of said catholyte compartment to produce a drain rate of about 1.0 volt and above 0.5 ampere per square inch.

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**3,920,475**

## ALKALINE GALVANIC CELL

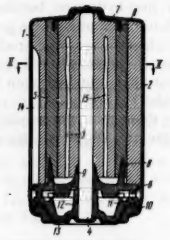
**Faat Khatovich Nabiullin, 3 Mytischinskaya ulitsa, 14A, kv. 90; Zoya Mikhailovna Buzova, 3 Mytischinskaya ulitsa, 14A, kv. 78; Efim Mikhailovich Gertsik, Malo-Moskovskaya ulitsa, 3, kv. 92; Ivan Ivanovich Koval, Novo-Peschanaya ulitsa, 23/7, kv. 369; Vladimir Mikhailovich Maslov, ulitsa Medvedeva, 11/6, kv. 1, and Ljudmila Nikolaevna Khamits, ulitsa Shirokaya, 24, kv. 83, all of Moscow, U.S.S.R.**

**Filed Mar. 21, 1974, Ser. No. 453,367**

**Int. Cl.[2] H01M** *29/02*

**U.S. Cl. 136—86 A** **14 Claims**

1. An alkaline galvanic cell comprising: a positive electrode having a terminal, the latter embracing one of the end faces and the peripheral surface of said positive electrode, forming at the same time a housing for the cell; a negative electrode having a bar terminal extending through said negative electrode; said electrodes being arranged coaxially and separated by an ion-permeable membrane; a spacer of an electrically insulating material to prevent short-circuits between said electrodes, mounted between said positive terminal and the end face of said negative electrode on one side of the cell; a washer of an electrically insulating material mounted adjacent the opposite end faces of said electrodes on the other side of the cell and provided with a hub fitted on said bar terminal; and a seal assembly including a gasket of an electrically insulating plastic material made with a hub fitted on said bar terminal on the side of said washer with its hub, and a metal cap incorporated into the material of said gasket for mutual



reinforcement, said cap being in contact with said bar terminal; said washer and said gasket with the respective hubs having an inside diameter smaller than the diameter of said bar terminal so as to be tightly fitted thereon; said cap being provided with holes at least partly filled with the material of said gasket to form passages in the body of the latter by punching, whereby air access is ensured to said positive electrode.

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**3,920,476**

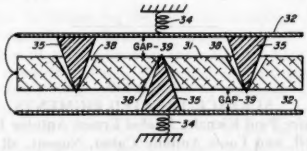
## ELECTRODE GAP CONTROL FOR ELECTRO CHEMICAL BATTERIES AND HEAT GENERATION SYSTEMS

**Stanley A. Black, Port Hueneme, and Sergius S. Sergev, Ventura, both of Calif., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.**

**Filed Sept. 19, 1974, Ser. No. 507,653**

**Int. Cl.[2] H01M** *17/00*

**U.S. Cl. 136—100 R** **10 Claims**




1. An electrode gap control system comprising electrochemical energy producing cells having a consumable anode and an inert cathode immersed in a liquid electrolyte, the improvement comprising:

a. at least one anode electrode and at least one cathode electrode;

b. a plurality of electrode spacer means mounted on and projecting from said at least one cathode electrode for spacing said at least one cathode electrode from said at least one anode electrode;

c. the width of each said projecting spacer means becoming gradually narrower as it extends from the cathode electrode surface until it reaches its apex;

d. a plurality of chamfered holes in the anode electrode, equal to and matching respective spacer means on the adjacent surface of the cathode electrode, in which the respective apex ends of said spacer means seat;

e. the included angle of said chamfered holes being greater than the included angle formed by the sides of said spacer means;

f. means for providing a loading force on said anode and cathode electrodes in a direction toward each other;

g. the apex of said spacer means traveling through said chamfered holes as the surface of the anode electrode is consumed by electrolytic action, resulting in the chamfered holes becoming larger and thereby automatically adjusting the spacing between said anode and cathode electrodes.

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3,920,477

## COMPACT BATTERY

Raymond Daniel Alaburda, Wilmington, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed May 1, 1974, Ser. No. 465,875
Int. Cl. H01m *23/00*
U.S. Cl. 136—108 5 Claims

1. A battery of at least two flat galvanic cells of the type having a cathode and an anode of thin, flat configuration, a porous nonconductive separator between the cathode and the anode, and a conductive electrolyte contacting the anode, the cathode and the separator, the cells being disposed in the same plane and spaced apart from one another, wherein the improvement comprises at least one first plate current collector contacting an anode and cathode of two adjacent cells and providing at least part of a sidewall of the battery, and two second plate current collectors, each contacting the opposite electrode of one cell with which a first plate current collector is in contact, the second plate current collectors providing at least part of a sidewall of the battery.

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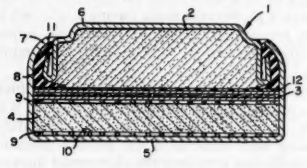
3,920,478

## DIVALENT SILVER OXIDE-ZINC CELL HAVING A UNIPOTENTIAL DISCHARGE LEVEL

Akiya Kozawa, Middleburg Heights, Ohio, assignor to Union Carbide Corporation, New York, N.Y.

Filed June 25, 1974, Ser. No. 482,996
Int. Cl.[2] H01M *6/12, 4/24*
U.S. Cl. 136—111 23 Claims



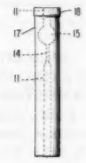
1. In an alkaline silver oxide cell comprising a negative electrode, a positive electrode housed in a conductive container having a bottom surface and a side wall, a separator disposed between said negative electrode and said positive electrode, and an electrolyte; said positive electrode comprising divalent silver oxide, the improvement wherein a discontinuous oxidizable metal material is interposed between and in electrical and physical contact with said positive electrode and the inner surface of the conductive container, so that the reaction of the oxidizable metal in the presence of the electrolyte will produce a substantially unipotential discharge over the useful life of the cell.

3,920,479

## ELECTRODES FOR STORAGE BATTERIES

Erik Westberg, Lidingo; John Andersson, Nol, and Erik Sundberg, Stockholm, all of Sweden, assignors to Aktiebolaget Tudor, Stockholm, Sweden

Filed Dec. 26, 1973, Ser. No. 427,546
Claims priority, application Sweden, Dec. 4, 1972, 15732/72
Int. Cl.[2] H01M *3/00*
U.S. Cl. 136—148 5 Claims



1. The method of forming an insulating sheath for an active material surrounded conductive rod of a lead-acid battery of the liquid electrolyte type comprising the steps of:

a. forming a tubular member of fibrous material resistant to attack by said electrolyte;
b. cutting said tubular member into lengths that are suitable as an electrode sheath;
c. applying a thermoplastic material in a solid state along a short length less than about a centimeter at an end portion of said sheath where the tubular member was cut;
d. heating said end portion to an extent sufficient to cause said thermoplastic material to bond with said fibrous material and thereby form a mechanical bonding of the loose end fibers on said sheath; and
e. thereafter placing said tubular member over said conductive rod and filling said tubular member with active material.

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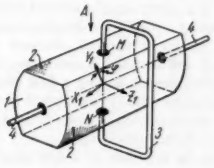
3,920,480

## MONOCRYSTALLINE ANISOTROPIC THERMOELEMENT HAVING SHORTED EMF VECTOR IN THE DIRECTION COINCIDENT WITH THAT OF THE THERMAL FLUX

Lukyan Ivanovich Anatychuk, Proezd Fizkulturny, 4, kv. 21; Valentin Trofimovich Dimitraschuk, Proezd Fizkulturny, 17, kv. 100, and Oleg Yanovich Luste, ulitsa Lomonosova, 6, kv. 4, all of Chernovtsy, U.S.S.R.

Continuation-in-part of Ser. No. 235,520, March 17, 1972, abandoned. This application Dec. 4, 1973, Ser. No. 421,633
Int. Cl.[2] H01V *1/02*
U.S. Cl. 136—205 7 Claims



1. A thermoelement comprising a monocrystal possessing different electric conduction coefficients along at least two principal crystallographic axes, wherein a thermoelectromotive force is developed under the effect of the thermal flux therethrough; at least one shorting member electrically connecting at least two points on said monocrystal, which lie opposite to each other on the outer surface thereof and in the plane passing through said two principal crystallographic axes, so that the straight line interconnecting these points forms an

angle other than 0° and 90° with one of said principal crystallographic axes; said shorting member being designed to short the thermoelectromotive force component the direction whereof coincides with that of said thermal flux; leads to tap current from said monocrystal in a direction normal to said straight line interconnecting said two points on said monocrystal and in said plane passing through said two principal crystallographic axes.

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**3,920,481**

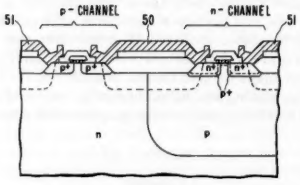
**PROCESS FOR FABRICATING INSULATED GATE FIELD EFFECT TRANSISTOR STRUCTURE**

**Daniel C. Hu, San Jose, Calif., assignor to Fairchild Camera and Instrument Corporation, Mountain View, Calif.**

**Filed June 3, 1974, Ser. No. 475,357**

**Int. Cl.[2] H01L** *21/265*

**U.S. Cl. 148—1.5** **12 Claims**




1. In a process of fabricating a complementary insulated gate field effect transistor structure wherein n-channel and p-channel devices are fabricated in the same semiconductor substrate including the steps of forming a well of a first conductivity type in a substrate of a second and opposite conductivity type, forming a conductor-insulator-semiconductor field effect device having a second channel conductivity type within said well and forming a conductor-insulator-semiconductor field effect device having a first channel conductivity type in said substrate, the improvement comprising:

forming the source/drain regions of said conductor-insulator-semiconductor devices by:

introducing an impurity of a first conductivity type into the source/drain in regions of both of said devices, and introducing an impurity of a second conductivity type opposite to said first conductivity type into the source/drain regions of said device having said second channel conductivity type, the concentration of said impurity of said second conductivity type in said source/drain regions being greater than the concentration of said impurity of said first conductivity type so that the impurity of said second conductivity type counterdopes said impurity of said first conductivity type to produce source/drain regions of said second conductivity type.

**3,920,482**

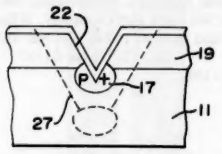
**METHOD FOR FORMING A SEMICONDUCTOR STRUCTURE HAVING ISLANDS ISOLATED BY ADJACENT MOATS**

**Lewis K. Russell, San Jose, Calif., assignor to Signetics Corporation, Sunnyvale, Calif.**

**Filed Mar. 13, 1974, Ser. No. 450,566**

**Int. Cl.[2] H01L** *21/265*

**U.S. Cl. 148—1.5** **3 Claims**




3. A method as in claim 1 where said moats are formed by an isotropic etch to form U-shaped moats and the bites of the Us intersect said buried impurities.

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**3,920,483**

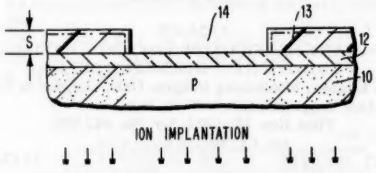
**METHOD OF ION IMPLANTATION THROUGH A PHOTORESIST MASK**

**Claude Johnson, Jr., Yorktown Heights; Ku San-Mei, Poughkeepsie; Harold Vinell Lillja, Peekskill, and Edward Shih-To Pan, Poughkeepsie, all of N.Y., assignors to IBM Corporation, Armonk, N.Y.**

**Filed Nov. 25, 1974, Ser. No. 527,115**

**Int. Cl.[2] H01L** *21/26*

**U.S. Cl. 148—1.5** **7 Claims**




1. In the method of forming regions of a selected conductivity characteristic in a semiconductor substrate by ion implantation through a photoresist mask having a selected thickness sufficient to prevent ion penetration into said substrate and openings corresponding to said regions, the improvement comprising

first forming a photoresist mask having a thickness of (S+R), where S is said selected thickness and R is at least 1,000A, and then, prior to said ion implantation step, subjecting said mask to a gas plasma oxidation for a period sufficient to reduce the photoresist thickness by R.

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**3,920,484**

**METHOD OF MANUFACTURING SEMICONDUCTOR DEVICE**

**Setsuo Ogura, Huchu, and Naonobu Sato, Kodaira, both of Japan, assignors to Hitachi, Ltd., Japan**

**Filed Dec. 4, 1973, Ser. No. 421,651**

**Claims priority, application Japan, Dec. 6, 1972, 47-121566**

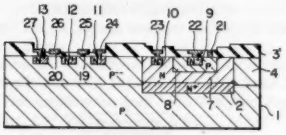
**Int. Cl.[2] H01L** *21/00*

**U.S. Cl. 148—1.5** **16 Claims**

11. A method according to claim 8, wherein said step (b) comprises the steps of

b1. selectively forming an insulating masking layer on the surface of said semiconductor substrate, exposing the

surface thereof at said selected first portion, and




b2. implanting ions of said second conductivity type into said semiconductor substrate, to form said collector region.

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**3,920,485**

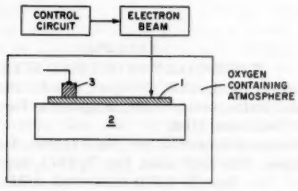
## THIN INSULATING FILM CONTAINING METALLIC PARTICLES

**George S. Ansell, Loudonville; Gary Judd, Albany, and Carl A. Grove, Schenectady, all of N.Y., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.**

**Filed May 21, 1973, Ser. No. 362,143**

**Int. Cl.[2] B44D** *1/18*; **B22F** *1/18*

**U.S. Cl. 148—6.3** **1 Claim**




1. A method for fabricating a thin film electronic circuit component which comprises the steps of

exposing a surface area of a metallic element to an atmosphere containing oxygen so as to cause an insulating oxide layer to start forming thereon and while said layer is being formed, directing a high energy electron beam into selected locations within said area so that ions of the metallic substance, which are diffusing through said oxide layer at said locations as said layer is being formed, become deionized by the capture of an electron,

the neutral atoms of the metallic substance thus formed subsequently capturing electrons, becoming charged oppositely from the diffusing metallic ions which migrate thereto, become deionized and contribute to the growth of platelets within said oxide layer whereby a thin insulating film containing conducting platelets is produced.

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**3,920,486**

## METHOD OF BLACKENING FERROUS METAL SURFACES

**John K. Howell, Jr., Rochester, and Lawrence J. Balash, Southfield, both of Mich., assignors to Oxy Metal Industries Corporation, Warren, Mich.**

**Continuation-in-part of Ser. No. 359,146, May 10, 1973, abandoned. This application Mar. 4, 1974, Ser. No. 448,168**

**Int. Cl.[2] C23F** *7/04*

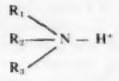
**U.S. Cl. 148—6.14 R** **10 Claims**

1. A method of forming a corrosion resistant and decorative black coating on a predominately iron surface of a workpiece, comprising contacting said surface with an aqueous acidic solution consisting essentially of:

1. at least 0.01 wt. % nitrate ion and

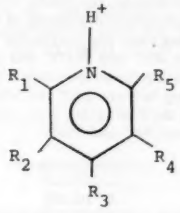
2. a soluble nitrogen containing cation selected from the group consisting of

a. ammonium derivatives of which have the formula




and,

b. pyridinium derivatives which have the formula




wherein $R_1$ through $R_5$ are independently selected from hydrogen alkyl, aryl, and aryl radicals containing —OH, >C=O, or $-NH_2$ substituents and wherein the nitrogen containing ion is present in a mole ratio of cationic nitrogen to nitrate of from 0.001 to 10:1 at a temperature of from 140°F up to the boiling point of the solution.

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**3,920,487**

## PRESS FORMING COLD ROLLED STEEL SHEET AND A PRODUCING METHOD THEREOF

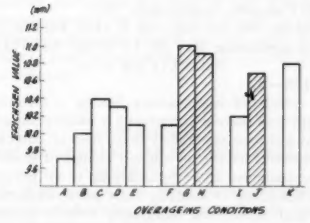
**Hisashi Gondo; Hiroshi Takechi; Mitsunobu Abe, all of Kisarazu; Norimasa Uehara, and Kunihiko Komiya, both of Kimitsu, all of Japan, assignors to Nippon Steel Corporation, Tokyo, Japan**

**Filed Sept. 21, 1973, Ser. No. 399,530**

**Claims priority, application Japan, Sept. 26, 1972, 47-95728; Sept. 26, 1972, 47-95729**

**Int. Cl.[2] C21D** *9/48*

**U.S. Cl. 148—12 C** **1 Claim**




1. A method for producing a slow ageing cold rolled steel plate for press forming comprising hot rolling a steel slab having a chemical composition comprising not more than 0.1% carbon and not more than 0.30% manganese in which

$$0.002.N\ (ppm) - 0.03 \leqslant K \leqslant 0.17 + 0.002.N(ppm)$$

where,

$$K = Mn(\%) - \frac{55}{32}S(\%) - \frac{55}{16}O(\%),$$

coiling the hot rolled strip at a temperature between 600° and $[850 - 2.1 \times 10^3 \times C(\%)]$ °C, cold rolling the hot rolled strip by a conventional method, and passing the cold rolled strip thus obtained continuously through a continuous annealing furnace composed of a heating and soaking zone, a primary cooling zone, an overageing zone, and a secondary cooling zone arranged in series, in which 30 seconds to 5 minutes heating and soaking is effected at a temperature between 650° and $[1680 - 4.6 \times 10^3 \times C(\%) -$ the hot coiling temperature $(20\ C)]$ °C in the heating and soaking zone, cooling down to the starting temperature of overageing or below is effected in the primary cooling zone, and overageing with a starting temperature between 400° and 500°C and then step-wisely or continuously lowering the temperature at the starting temperature of overageing between 200° and 500°C is effected for 2 to 10 minutes in the overageing zone, and the overageing is completed between 200° and 350°C.

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**3,920,488**

## PROCESS FOR COLORING ALUMINUM BLACK

**Oscar Pitton, Schleitheim, Switzerland, assignor to Swiss Aluminium Ltd., Chippis, Switzerland**

**Filed Apr. 25, 1974, Ser. No. 464,328**

**Claims priority, application Switzerland, May 17, 1973, 7035/73**

**Int. Cl.[2] C23F** *7/06*

**U.S. Cl. 148—6.27** **11 Claims**

1. A process for producing a matte black conversion coating on a metal surface of aluminum or its alloys which coating bonds well, is uniform and is corrosion resistant;

said process comprising the steps of:

etching said surface with an aqueous iron chloride solution; subsequently

coloring the etched surface in a coloring bath comprising an aqueous solution containing from about 25 grams to about 70 grams per liter ammonium-hepta-molybdate and from about 10 grams to about 100 grams per liter aluminum trichloride; and thereafter

treating the colored surface in an after-treatment bath comprising an aqueous alkaline solution at a temperature of about 80°C to about 92°C.

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**3,920,489**

## METHOD OF MAKING SUPERALLOY BODIES

**Edward R. Buchanan, Burnt Hills, N.Y., assignor to General Electric Company, Schenectady, N.Y.**

**Division of Ser. No. 402,306, Oct. 1, 1973, Pat. No. 3,850,702. This application May 28, 1974, Ser. No. 473,407**

**Int. Cl.[2] C22F** *1/10*

**U.S. Cl. 148—32** **8 Claims**

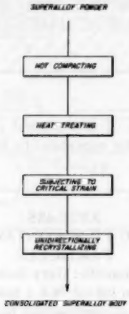
1. An article of manufacture having a chemically inert phase dispersed therein comprising a unidirectionally recrystallized nickel-base superalloy body free of eutectic module inhomogenieties having an aligned elongated grain or monocrystalline structure and containing up to 10 percent by volume of chemically chamically inert phase dispersed therein wherein said nickel-base superalloy body is prepared by a method comprising the steps of:

a. hot compacting a nickel-base superalloy powder to form a relatively dense solid consisting essentially of a $\gamma'$ precipitate phase within a $\gamma$ matrix,

b. solution heat treating the dense solid at a temperature below the incipient melting point and high enough to dissolve a substantial portion of the $\gamma'$ phase,

c. subjecting the material to a sufficient strain below the recrystallization temperature to permit subsequent recrystallization, and

d. unidirectionally recrystallizing the strained material in a temperature gradient below the incipient melting temperature and above the $\gamma'$ solvus temperature to form a body having an aligned elongated grain or monocrystalline structure.

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**3,920,490**

## THERMALLY PROCESSED STEEL

**Theodore J. Koppenaal, Newport Beach, and Richard P. Sernka, Irvine, both of Calif., assignors to Ford Motor Company, Dearborn, Mich.**

**Continuation-in-part of Ser. No. 172,808, Aug. 8, 1971, abandoned. This application Dec. 7, 1973, Ser. No. 422,947**

**Int. Cl.[2] C21D** *6/04, 7/02, 1/22*

**U.S. Cl. 148—12.4** **7 Claims**

1. The process of producing articles from a steel of high-strength and elongation having a metallurgical structure essentially comprised of reverted austenite, by controlled heat treatment, the process comprising:

heating a steel blank to a temperature at which said blank is completely austenitic, the chemistry of said blank consisting essentially of 0.22–0.36% carbon, 19.9–24.5% Ni, 2.0–4.1% Mo and the balance essentially iron, and selected to produce initial thermal martensite start temperature ($M_s$) and deformation martensite start temperature ($M_d$), both below ambient and an austenite reversion temperature below the temperature at which austenite recrystallizes, cooling the steel blank to produce a predominantly austenitic structure, subjecting this cooled blank to a temperature sufficiently low to transform a substantial portion of the austenite to martensite having a first level of strength, heating this martensitic blank to a temperature adequate to cause a substantial portion of the martensite to revert to austenite, but at a temperature below that at which the reverted austenite recrystallizes, said reverted austenite having a first level of elongation, cooling this reverted austenite blank to cause its structure to become at least partially martensitic and repeating this cycle of reverted austenite-martensite-reverted austenite until both the $M_d$ is increased above said ambient temperature and the blank defines an article having a strength level greater than said first strength level and an elongation level at least 80% of said first elongation level.

2. The process recited in claim 1, in which the blank is additionally subject to strain below the final $M_d$, thereby inducing the transformation of the reverted austenite steel to martensitic steel, whereby the strength of the strained steel is increased above the strength level resulting from said thermal cycling.

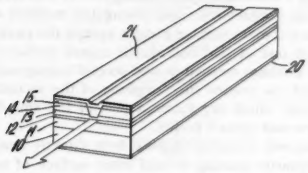
## 3,920,491
## METHOD OF FABRICATING A DOUBLE HETEROSTRUCTURE INJECTION LASER UTILIZING A STRIPE-SHAPED REGION

**Hiroo Yonezu, Tokyo, Japan, assignor to Nippon Electric Co., Ltd., Tokyo, Japan**

**Continuation of Ser. No. 413,923, Nov. 8, 1973, abandoned, which is a continuation of Ser. No. 267,068, June 28, 1972, abandoned. This application July 26, 1974, Ser. No. 492,262**

**Int. Cl.[2] H01L** *21/205, 21/22, 33/00*

**U.S. Cl. 148—175** **3 Claims**




1. A method of producing a GaAs-$Al_xGa_{1-x}As$ double hetero-structure injection laser comprising the steps of preparing an N-type GaAs substrate, epitaxially growing a first layer of N-type $Al_xGa_{1-x}As$ on one major surface of said substrate, epitaxially growing a second layer of P-type GaAs on said first layer, epitaxially growing a third layer of P-type $Al_xGa_{1-x}As$ on said second layer, epitaxially growing a fourth layer of N-type GaAs on said third layer, selectively diffusing P-type impurities into an elongated surface portion of said fourth layer to form a thin elongated P-type region on the surface of said fourth layer extending depthwise to a portion of said third layer, and forming first and second electrodes in ohmic contact with the whole surface of said fourth layer and with the other major surface of said substrate, respectively, wherein excitation current supplied through said first electrode is allowed to flow substantially only through the deepest portion of said thin elongated p-type region as the result of a reverse bias developed between said third and fourth layers.

## 3,920,492
## PROCESS FOR MANUFACTURING A SEMICONDUCTOR DEVICE WITH A SILICON MONOCRYSTALLINE BODY HAVING A SPECIFIC CRYSTAL PLANE

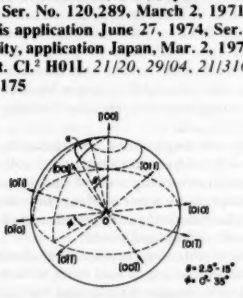
**Yoshimitsu Sugita, Kokubunji; Teruo Kato, Kodaira; Katsuro Sugawara, Kodaira, and Masao Tamura, Tokorozawa, all of Japan, assignors to Hitachi, Ltd., Japan**

**Division of Ser. No. 120,289, March 2, 1971, Pat. No. 3,821,783. This application June 27, 1974, Ser. No. 483,837**

**Claims priority, application Japan, Mar. 2, 1970, 45-17084**

**Int. Cl.[2] H01L** *21/20, 29/04, 21/316*

**U.S. Cl. 148—175** **8 Claims**




1. A process for manufacturing a semiconductor device comprising the steps of preparing a silicon monocrystalline body having a major surface having a crystal plane, except for the (810) plane and a plane deviating 1° therefrom, with a crystallographic orientation deviating 2.5° to 15° from the [100] axis toward an axis, in the (100) plane, selected from the group consisting of 0° to 35° off one of the axes [010], [001], [010] and [001]; epitaxially depositing a silicon layer on said major surface of said silicon body from vapor phase; thermally oxidizing said silicon body, thereby an insulating film consisting essentially of silicon oxide is formed on said major surface of said body.

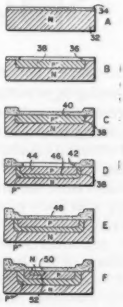
## 3,920,493
## METHOD OF PRODUCING A HIGH VOLTAGE PN JUNCTION

**Bernard L. Kravitz, Forest Hills, N.Y., assignor to Dionics, Incorporated, Westbury, N.Y.**

**Continuation-in-part of Ser. Nos. 175,124, Aug. 26, 1971, abandoned, and Ser. No. 259,763, June 5, 1972, abandoned. This application Nov. 15, 1973, Ser. No. 416,171**

**Int. Cl.[2] H01L** *21/22*

**U.S. Cl. 148—187** **9 Claims**




1. In the construction of diffused, planar semiconductive devices including the diffusion of one conductivity-type material into a body of semiconductive material having a concentration of the opposite conductivity type impurities of less than about $10^{15}$ atoms/cc, thereby to form a PN junction extending to a surface of said body, the improvement comprising diffusing said one conductivity impurity in interchangeable first and second stages, said first stage being carried out for sufficient time to establish a concentration of less than about $10^{16}$ atoms/cc, which establishes said junction, and said second stage diffusion being within an area entirely surrounded on said surface and within said body by said first stage diffusion and being carried out for sufficient time to establish an average impurity concentration of said one conductivity type of from two to four orders of magnitude greater than in said first stage diffusion.

## 3,920,494
## PROPELLANT PRESSURE BURNING RATE SLOPE MODIFICATION

**Martin H. Kaufman, China Lake, Calif., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.**

**Filed Sept. 25, 1972, Ser. No. 293,258**

**Int. Cl.[2] C06D** *5/06*

**U.S. Cl. 149—19.3** **5 Claims**

1. The method of varying the burning rate-pressure curve of a propellant composition which contains 7 parts by weight butyl rubber, 16 parts by weight polytetrafluoroethylene and 77 parts by weight ammonium perchlorate which comprises:
a. providing said propellant composition; and
b. adding triphenyl phosphine thereto.

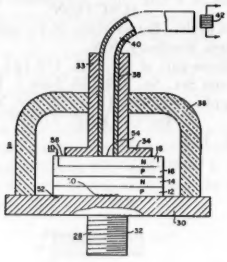
## 3,920,495
## METHOD OF FORMING REFLECTIVE MEANS IN A LIGHT ACTIVATED SEMICONDUCTOR CONTROLLED RECTIFIER

**John S. Roberts, Export, Pa., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.**

**Continuation-in-part of Ser. No. 248,451, April 28, 1972, abandoned. This application Aug. 29, 1973, Ser. No. 392,698**

**Int. Cl.**[2] **H01L** *7/00*

**U.S. Cl. 156—8** **3 Claims**



1. A process for forming light radiation reflecting tetrahedral etch pits in a preselected surface portion of a body of silicon comprising; masking preselected surface portions of a body of silicon with a material capable of withstanding hydrofluoric acid, immersing said body of silicon in hydrofluoric acid to remove any oxides from the unmasked surface portion of the body, immersing said body in an etching solution for a preselected period of time while agitating the solution relative to said body, whereby, tetrahedral etch pits are formed in the unmasked surface portion of the body, said etching solution having been prepared by forming a first solution by admixing 100 grams of chromium trioxide in 100 milliliters of water, and just prior to etching adding 100 milliliters of 49% hydrofluoric acid to 100 milliliters of said first solution, and removing said body from said etching solution, quenching said body with deionized water and thereafter removing said masking material from said body.

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## 3,920,496
## CORRUGATED PAPERBOARD AND ITS METHOD OF MANUFACTURE

**Michael C. Wilkinson, Braemore High St., Shrewton, Wiltshire, England; Leo Blais, 322 Lambert St., Shawinigan, Quebec; Wilhelm N. Martin, 880-14th Ave., Grand'Mere, Quebec, and Silvano Tesainer, 413 Scarsdale Crescent, Oakville, Ontario, all of Canada**

**Continuation-in-part of Ser. No. 227,959, Feb. 22, 1972, Pat. No. 3,811,987, which is a division of Ser. No. 819,752, April 28, 1969, abandoned. This application Apr. 15, 1974, Ser. No. 460,981**

**Int. Cl.**[2] **B31F** *1/20, 1/22;* **B29C** *25/00*

**U.S. Cl. 156—82** **3 Claims**

1. In the process of manufacturing a water-resistant, warp-free, heat sealable corrugated paperboard consisting of at least two liners each having an inner surface and an outer surface and a medium having a pair of oppositely disposed surfaces, the steps of:

a. sizing the surfaces of said liners and medium to an extent sufficient to inhibit the water wicking tendencies of said liners and medium when functioning as water-resistant components in said corrugated paperboard;

b. coating the entire area of each of said surfaces of said medium with a layer of thermoplastic material to form a coated medium having a pair of oppositely disposed coated surfaces;

c. coating the entire area of said inner and outer surface of each of said liners with a layer of thermoplastic material to form a first and second coated liner each having a coated inner surface and a coated outer surfac;

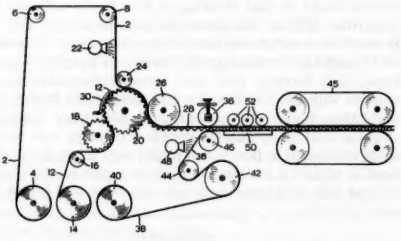
d. continuously corrugating said coated medium between a first and second meshing corrugated roll to form a pair of oppositely disposed corrugated coated surfaces and during said corrugating maintaining said coated medium

i. at a temperature sufficient for said coated medium to mold into the desired corrugated shape but below the melting point of the thermoplastic material,

ii. meshed in the second corrugated roll beyond said first corrugated roll and between two points spaced apart by a first annular arc around the periphery of the second roll;

e. bringing a continuously advancing web of said first coated liner into contact with said corrugated medium wherein said coated inner surface presses against the peaks of the flutes of one of said corrugated coated surfaces of the coated medium meshed in said second corrugated roll in a second arc around the periphery of the second corrugated roll which arc forms a part of the said first arc between said spaced points;

f. continuously directing intense heat directly against the thermoplastic coating of said inner surface of said first coated liner near the beginning of the second arc, said heat being sufficient to melt said coating to render said surface tacky and bondable all the way across the liner



before it comes into contact with said corrugated medium so that on contact it will bond to the peaks of said flutes;

g. maintaining said first coated liner in contact with the peaks of said flutes over said second arc and cooling said first coated liner to cool said first heated surface for a period of time sufficient to permit the thermoplastic material to harden before the medium with the liner bonded to one side of it emerges from contact with said second corrugated roll, thereby forming a single-faced corrugated board;

h. removing said single-faced corrugated board away from contact with said second corrugated roll and bringing a continuously advancing web of said second coated liner into contact at its inner surface with the peaks of the flutes of the remaining corrugated coated surface of said single-faced corrugated board;

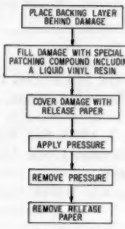
i. continuously directing intense heat directly against the thermoplastic coating of said inner surface of said second coated liner to render it tacky and bondable to the peaks of said flutes of said remaining coated surface; and

j. maintaining said second coated liner in contact with said peaks and cooling said second coated liner to cool said remaining coated surface for a period of time sufficient to permit the thermoplastic material to harden thereby bonding said second liner to said medium to form said water-resistant, warp-free, corrugated paperboard.

## 3,920,497
## METHOD FOR REPAIRING MATERIALS SUCH AS PLASTICS

**Lawrence Speer, Amsterdam, N.Y., assignor to Vinyltron Corp., Amsterdam, N.Y.**

**Filed Apr. 26, 1974, Ser. No. 464,541**
**Int. Cl.[2] B32B** *35/00*
**U.S. Cl. 156—94** **6 Claims**


PLACE BACKING LAYER BEHIND DAMAGE
FILL DAMAGE WITH SPECIAL PATCHING COMPOUND INCLUDING A LIQUID VINYL RESIN
COVER DAMAGE WITH RELEASE PAPER
APPLY PRESSURE
REMOVE PRESSURE
REMOVE RELEASE PAPER

**1.** A method for patching damage in a plastic or leather-like material comprising the steps of

a. placing a backing material against said damage thus forming a defined void in said material,

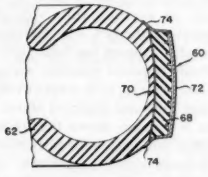
b. filling said void with a patching compound comprising a film forming latex polymer in water and a finely divided solid filler which is wet by said liquid, and

c. permitting said patching compound to gell in said void.

## 3,920,498
## METHOD AND APPARATUS FOR RETREADING PNEUMATIC TIRES

**William F. Everhardt, and Henry L. Brown, Jr., both of Macon, Ga., assignors to American Power Tread Corporation, Macon, Ga.**

**Filed Oct. 4, 1974, Ser. No. 512,088**
**Int. Cl.[2] B29H** *5/01, 5/04, 17/36*
**U.S. Cl. 156—96** **35 Claims**




**1.** A process for retreading pneumatic tire casings with a prevulcanized rubber tread strip comprising:

a. mounting a tire casing on a mounting rim,

b. positioning a prevulcanized rubber tread strip around the circumference of said tire casing with a heat curable adhesive between said tread stripp and said tire casing,

c. encircling the casing-tread strip in a one piece metal band pressure ring snugly engaging the tread strip and a portion of the side walls of the casing so that the tread strip is firmly positioned on the casing and no further clamping is required,

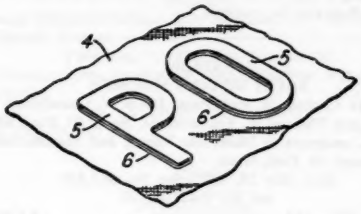
d. inflating said tire casing to a pressure of at least about 25 psi within said pressure ring so that said tread strip is pressed against said tire casing,

e. circulating air at a temperature of at least about 250°F and substantially atmospheric pressure around the periphery of the tire casing-pressure ring assembly and thereby curing said adhesive and bonding said tread strip to said casing.

## 3,920,499
## METHOD OF APPLYING HEAT-SEALABLE MARKING LABELS FOR FLEXIBLE ARTICLES

**Ian Harold Day, and John Carmichael-Drage, both of London, England, assignors to Polymark Corporation, Cincinnati, Ohio**

**Continuation of Ser. No. 71,056, Sept. 10, 1970, abandoned. This application Mar. 6, 1974, Ser. No. 448,789**
**Claims priority, application United Kingdom, Sept. 19, 1969, 46301/69**
**Int. Cl.[2] B44C** *1/10;* **B32B** *3/16;* **G03C** *11/00*
**U.S. Cl. 156—240** **2 Claims**

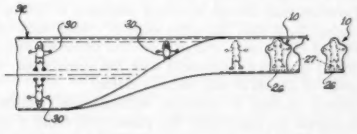



**1.** A method of producing permanent markings on flexible articles comprising applying under heat and pressure a transfer consisting of a temporary support having release properties and having printed thereon a pattern or marking consisting of distinct informative characters incorporating a heat-curable resin system and a pigment, the heat and pressure serving to bond the characters to the surface of the article and to effect curing of the resin, in which the characters of the transfer are each covered with a superimposed layer of a clear heat-curable resin system in a manner to overlap the boundary edges of the characters and which is bonded to the article to be marked with the character supported primarily by the clear resin without providing a continuous layer over the whole area of the permanent markings, said transfer being prepared by first printing the characters on the temporary support with a fine screen mesh and then printing the superimposed layer of clear resin system on the characters with a coarse screen mesh, each of said screens including a photographically produced stencil, the stencil associated with the coarse screen mesh being of increased size to increase the size of the printing area in every direction and to ensure that the clear heat-curable resin layer overlaps the characters produced by the fine screen mesh in all directions, said increase in size being carried out photographically by interposing a thick sheet of transparent film between a positive and the stencil to scatter the projected light.

## 3,920,500
## METHOD OF MAKING FLEXIBLE PLASTIC ARTICLES

**Bernard F. Brieske, Palatine, Ill., assignor to Vision-Wrap Industries, Inc., Palatine, Ill.**

**Filed Nov. 21, 1973, Ser. No. 418,109**
**Int. Cl. B32b** *1/04, 31/12, 31/18*
**U.S. Cl. 156—251** **4 Claims**




**1.** A method for the production of flexible plastic articles comprising the steps of locating a pair of flexible plastic films in overlying relationship, applying printing on one exposed surface of one film, folding the films whereby printed portions thereof are located in face-to-face relationship and whereby

four thicknesses of film are provided with a foldline defined along one side thereof, die cutting the film through said four thicknesses, the resulting die cut defining an edge on each article extending from said foldline around the periphery of the article and back to the foldline whereby an intact foldline portion remains on each article, heat sealing each article around said periphery thereof, and perforating each article along a line spaced closely inwardly from and substantially parallel to, the foldline portion of the article, the portion of an article between the perforated line and the foldline portion being removable to expose free edges of the films whereby the article is divisible into separate sections with each section comprising a pair of attached films whereby means can be inserted between the sections.

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**3,920,501**

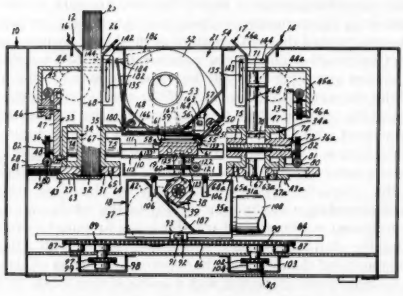
## SHEET BINDING MACHINE

**Robert D. Carlton, St. Paul Park; Davis W. Chamberlin, St. Paul, and Thomas W. Featherstone, North St. Paul, all of Minn., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.**

**Filed May 25, 1973, Ser. No. 363,836**

**Int. Cl.[2] B42C** *13/00*

**U.S. Cl. 156—364** **6 Claims**



**1.** A machine for binding a stack of sheets by applying a strip of flexible heat softenable binding material to a spine edge of the stack, said machine including:

a frame;

first and second clamps each having two clamp members relatively movable between an open position affording manual insertion of a said stack of sheets between said clamp members and a clamping position adapted to clamp a said stack of sheets between said clamp members on opposite surfaces thereof;

cutter means adapted for transversely scoring the spine edge of a said stack of sheets in either of said clamps when its clamp members are in said clamping position, said cutter means being mounted on said frame for movement along a cutter path from a disengaged position between said clamps in a first direction to afford cutting engagement with the spine edge of a said stack of sheets in said first clamp and in a second opposite direction to afford cutting engagement with the spine edge of a said stack of sheets in said second clamp;

a platen having a support surface, said platen being mounted on said frame for movement from a receiving position between said clamps to a first applying position with said support surface adjacent the spine edge of a said stack of sheets in said first clamp and in an opposite direction to a second applying position with said support surface adjacent the spine edge of a said stack of sheets in said second clamp;

dispensing means adapted for dispensing a said strip of binding material to the support surface of said platen when the platen is at said receiving position;

means for heating said support surface adapted to heat and soften a said strip of binding material on said support surface; and

means affording relative movement between either one of said clamps and said platen when said platen is adjacent the clamp for pressing the spine edge of a said stack of sheets in the clamp into engagement with a said strip of heated binding material on said support surface.

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**3,920,502**

## APPARATUS FOR SPLICING PAPER ROLLS

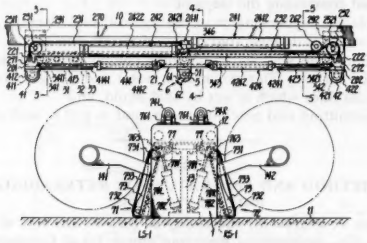
**Masateru Tokuno, Nishinomiya, Japan, assignor to Rengo Co., Ltd., Osaka, Japan**

**Filed Aug. 7, 1973, Ser. No. 386,293**

**Claims priority, application Japan, Mar. 7, 1973, 48-26748; Apr. 24, 1973, 48-47068**

**Int. Cl.[2] B65H** *19/08*

**U.S. Cl. 156—504** **8 Claims**

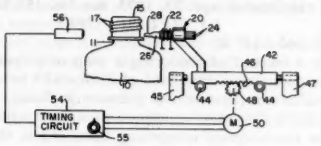


**1.** An apparatus for splicing a leading end of a fresh web roll which is releasably attached to said roll and which is not yet unwound, with a running web which is being continuously withdrawn from an expiring roll, without interrupting the continuous operation thereof which comprises a mill stand adapted to rotatably support the fresh web roll and the expiring roll in mutually opposed position, means for rotating said fresh web roll and expiring roll, respectively, a roll supporting frame having side rails and disposed above the mill stand and extending from a position above the fresh roll to a position above the expiring roll, means for suspending the roll supporting frame so that each end thereof may move up and down with the other end thereof acting as a pivot point, a pair of roll shaft holding plates mounted in said side rails and a pair of substantially parallel web pushing rolls rotatably mounted between said pair of roll shaft holding plates and bridging said side rails, driving means for shifting the position of the roll shaft holding plates containing the web pushing rolls from one end portion of the roll supporting frame to the other end portion thereof, an intermediate roll suspended below each end portion of the roll supporting frame, said intermediate roll being suspended with a slight play in the vertical direction and a free sliding movement along the roll supporting frame, means for moving each of the intermediate rolls along the roll supporting frame, a web guiding roll disposed above the mill stand and below the roll supporting frame for guiding the web running from the expiring roll, means for initiating the rotation of the fresh web roll prior to its contact with the intermediate roll, and means for splicing the leading end of the fresh web roll with the running web of the expiring roll by bringing said leading end and running web together either between said intermediate roll and one of said web pushing rolls or between the fresh web roll and one of said web pushing rolls.

## 3,920,503
## APPARATUS FOR SEALING PLASTIC CLOSURES TO PLASTIC CONTAINERS

**Frederick D. Keeler, Trumbull, Conn., assignor to The K L M Company, Stratford, Conn.**

**Division of Ser. No. 221,633, Jan. 28, 1972, Pat. No. 3,788,509. This application Nov. 18, 1973, Ser. No. 413,772**
**Int. Cl.² B32B** *31/00*
**U.S. Cl. 156—580** **3 Claims**




1. A system for sealing a plastic closure having a generally cylindrical wall to the generally cylindrical neck of a container of plastic material comprising

a work tool for applying ultrasonic energy to a portion of the wall of the plastic closure to distort the wall of the closure and the adjacent underlying neck portion of the container,

means for supplying ultrasonic energy to said work tool for a time period sufficient to distort both said closure and said container,

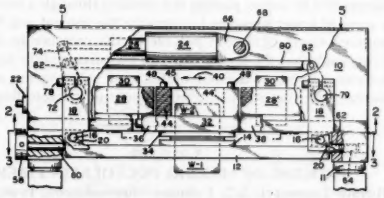
and means for moving said work tool relative to said closure and container in a limited path of travel while the work tool is receiving ultrasonic energy for an extent sufficient to produce a projection on the closure wall and a mating underlying depression on the container wall,

said work tool including a tip to engage the outer wall of the closure and to apply the ultrasonic energy thereto, said tip being shaped to conform generally to the shape of the closure skirt wall to form a said projection on the closure wall of substantially uniform depth throughout.

## 3,920,504
## FRICTION WELDING APPARATUS

**Andrew Shoh, Ridgefield, Conn., and Ernest P. Holze, Jr., Brewster, N.Y., assignors to Branson Ultrasonics Corporation, Stamford, Conn.**

**Filed Oct. 25, 1974, Ser. No. 517,970**
**Int. Cl.² B23K** *19/02*
**U.S. Cl. 156—580** **26 Claims**



1. A friction welding apparatus for joining workpieces comprising:

a support for holding a first workpiece;

a platform for holding a second workpiece to be joined to said first workpiece;

electomagnetic force generating means disposed for causing said platform to undergo reciprocating translating motion relative to said support along a first axis disposed in a plane;

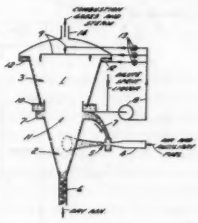
means coupling said platform to said support comprising yieldable members dimensioned for causing said platform to be in a rest position is the absence of said electromagnetic force and for causing said platform to undergo said reciprocating translating motion responsive to said electromagnetic force while substantially inhibiting motion of said platform along a second axis perpendicular to said plane, and for restoring said platform to said rest position responsive to the cessation of said electromagnetic force, and

means coupled to said support for providing an engagement force between the respective workpieces on said support and said platform in a direction along said second axis.

## 3,920,505
## METHOD AND APPARATUS FOR REMOVING VOLATILE FLUIDS

**Donald Edmund Helleur, 221 Mortlake Ave., St. Lambert, Quebec, Canada**

**Filed Aug. 7, 1973, Ser. No. 386,406**
**Claims priority, application United Kingdom, Aug. 9, 1972, 37102/72**
**Int. Cl.² B01D** *1/00, 1/16, 1/22*
**U.S. Cl. 159—47 WL** **6 Claims**



1. A process suitable for the continuous and simultaneous concentration and incineration of a dilute material at substantially any desired thermal efficiency, said material containing a combustible constituent and an incombustible non-volatile constituent diluted by a volatile easily condensable incombustible liquid, the process comprising the steps of continuously incinerating, at a given pressure dependent on said desired thermal efficiency and with the aid of a combustion supporting gas, a first portion of the material in the form of a combustible concentrate thereby producing an ash containing said incombustible constituent and hot radiant gases which gases include said liquid as a condensable vapor and relatively non-condensable combustion gases formed from the combustion of said combustible constituent, said combustible concentrate being as dilute as possible consistent with said combustibility so as to maximize the content of said vapor in said radiant gases; continuously adding a volume of said dilute material to a second portion of said concentrate, continuously bringing said hot radiant gases now saturated and cooler into intimate and turbulent contact for efficient and rapid direct-contact heat exchange with said second portion of said material less concentrated than said first portion whose temperature is lower than the highest temperature it could have when in equilibrium with said gases at said given pressure, such that maximum simultaneous use is made of the three main modes of heat exchange namely, radiant, mass and conductive exchange, all within one given region by providing the required space, time and contact for (i) maximizing said exchange particularly said mass exchange, and simultaneously (ii) heating said further portion and (iii) cooling said hot gases and (iv) saturating said non-condensable gases with said vapor; continuously removing said heated second portion from said region; continuously flash evaporating said removed heated second portion at a pressure lower than said given pressure to thereby (a) convert a part of said liquid present in said removed second portion into a condensable vapor substantially free of said uncondensable gases, and (b) further concentrate said removed second portion and (c) cool said removed second portion to a temperature lower than said equilibrium

temperature; continuously removing said gas-free condensable vapor from said flash evaporating step and recovering its heat value as a process vapor thereby establishing the desired thermal efficiency, continuously removing a small volume of said now further concentrated second portion for use as said combustible concentrate; continuously returning the large remaining volume of said cooled concentrated second portion to said region for further direct-contact heat exchange with further hot gases; and continuously removing said cooled hot saturated gases and said ash from said region.

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**3,920,506**

**WET COMBUSTION OF WASTE LIQUORS**

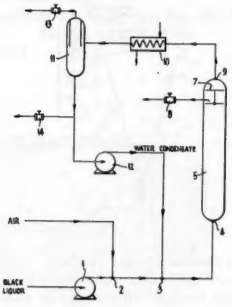
**John Edward Morgan, Burnie, Australia, assignor to Associated Pulp and Paper Mills Limited, Melbourne, Australia**

**Filed Apr. 19, 1971, Ser. No. 135,214**

**Claims priority, application Australia, May 8, 1970, 1134/70**

**Int. Cl.[2] D21C** *11/14*

**U.S. Cl. 162—31** **3 Claims**




**1.** A continuous process for the wet combustion of a waste liquor containing combustible constituents in which the waste liquor is reacted with oxygenating gas in a reaction space at a temperature between 450° F. and 705° F. at superatmospheric pressure, which comprises

a. establishing a stream of waste liquor and heated oxygenating gas;

b. passing said stream into and through a reaction space to produce an exit stream consisting of steam, non-condensible gas and liquid phase wherein the proportion of steam to non-condensible gas in the exit gaseous stream from the reaction space is substantially greater than in the waste liquor inlet stream at the inlet to the reaction space, the steam thus generated within the reaction space being substantially free of dissolved solids;

c. passing said exit stream, from the reaction space, through a separator to separate the steam and non-condensible gas from the liquor phase;

d. passing the steam and non-condensible gas from the separator through a condenser in which superheated water is condensed at a superatmospheric pressure slightly less than the pressure existing at the inlet of said reaction space;

e. raising the pressure of this superheated water to at least the pressure in the reaction space; and

f. injecting the superheated water under pressure into the stream of waste liquor and heated oxygenating gas at step (a) prior to the entry of said stream into the reaction space,

the temperature of the injected pressurized superheated water being higher than the temperature of the undiluted waste liquor in said stream but lower than the maximum reaction temperature in the reaction space and being sufficient to raise the temperature of the stream of oxygenating gas and diluted waste liquor to not less than 230° F. and simultaneously to dilute the waste liquor to a predetermined extent.

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**3,920,507**

**PROCESS OF MAKING POLYOLEFIN FIBERS**

**Hayato Yonemori, Iwakuni, Japan, assignor to Crown Zellerbach Corporation, San Francisco, Calif.**

**Continuation-in-part of Ser. No. 295,339, Oct. 5, 1972. This application Apr. 23, 1973, Ser. No. 353,859**

**Int. Cl.[2] D21F** *11/00*

**U.S. Cl. 162—157 R** **9 Claims**

**1.** In a method of producing a pulp of polyolefin fibers wherein an aqueous dispersion of a polyolefin in a solvent at an elevated temperature and pressure is flashed through a nozzle into a zone of reduced pressure to form a fibrous product, the improvement comprising dissolving in the aqueous phase of the dispersion from 0.75 to 10% by weight polyvinyl alcohol based on the weight of the polyolefin flashing said dispersion to form the fibrous product and passing the fibrous product at a temperature between about 10°C and 60°C through a primary refining zone under substantially atmospheric pressure in the presence of the polyvinyl alcohol under conditions such that a vigorous fibrillating action is imparted to the fibrous product.

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**3,920,508**

**POLYOLEFIN PULP AND PROCESS FOR PRODUCING SAME**

**Hayato Yonemori, Iwakuni, Japan, assignor to Crown Zellerbach Corporation, San Francisco, Calif.**

**Filed Oct. 5, 1972, Ser. No. 295,339**

**Claims priority, application Japan, Oct. 12, 1971, 46-79856; Feb. 14, 1972, 47-14919**

**Int. Cl.[2] D21F** *11/00*

**U.S. Cl. 162—157 R** **7 Claims**

**1.** A process for producing a polyolefin pulp comprising forming a mixture of a polyolefin, a solvent for the polyolefin at elevated temperatures, water as the continuous phase, and polyvinyl alcohol dissolved in the water, the mixture being at a temperature above the melt dissolution temperature of the polyolefin in the solvent and at substantially autogeneous pressure, the polyolefin being present in an amount of from about 0.5 to 15 percent by weight of the solvent, the polyvinyl alcohol being present in an amount from about 0.1 to 5 percent by weight of the polyolefin, the solvent being inert and stable at the mixture temperature and substantially immiscible in water or forming a polymer solution which is substantially immiscible in water; passing the mixture through a nozzle into a zone of lower pressure to vaporize the solvent and form an aqueous slurry of fibrous polyolefin, the pressure in the zone being such that the temperature of the mixture falls below the softening point of the polyolefin, and; refining the aqueous slurry of fibrous polyolefin into a pulp of discrete fibers.

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**3,920,509**

**PROCESS OF MAKING POLYOLEFIN FIBERS**

**Hayato Yonemori, 2-2, 1-chome Muronoki-cho, Iwakuni, Japan**

**Continuation-in-part of Ser. No. 295,339, Oct. 5, 1972. This application Mar. 12, 1973, Ser. No. 340,140**

**Int. Cl.[2] D21F** *11/00*

**U.S. Cl. 162—157 R** **11 Claims**

**1.** A process for manufacturing papermaking pulp of synthetic fibers comprising forming a mixture of a polymer and a solvent for such a polymer, flashing said mixture at a temperature which is high enough to bring said polymer to a plastic state and which will permit substantially complete vaporization of the solvent when the mixture is flashed, flashing said mixture into into a flash zone to produce a fibrous product, and refining the fibrous product, characterized in that

a. said flash zone is maintained at or below 600 mm Hg pressure,
b. said flashing temperature, the components of said mixture and the concentration of each in the mixture, with respect to their heat capacity and with respect to the heat of vaporization of the components vaporized during flashing, are all selected relative to each other to produce a temperature of less than 94°C in the flashed fibrous product upon evaporation of substantially all of said solvent,
c. the solvent has a vapor condensation point in the flash zone below 60°C,
d. dilution water is introduced into the flash zone at a temperature above the vapor condensation point of the solvent but below 70°C to form an aqueous mixture,
e. the aqueous mixture is passed directly to a refiner which is in direct pressure communication with the flash zone, and
f. the aqueous mixture is refined in the refiner at a temperature below 70°C to produce the papermaking pulp.

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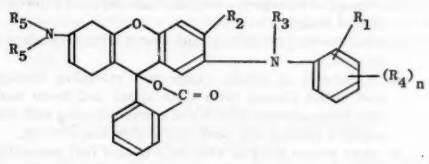
## 3,920,510
## PRESSURE-AND-HEAT-SENSITIVE COPYING PAPER

**Yoshihiro Hatano, Osaka, and Kenji Yamamoto, Yao, both of Japan, assignors to Yamamoto Kagaku Gosei Kabushiki Kaisha, Osaka, Japan**

**Filed July 31, 1973, Ser. No. 384,304**
**Claims priority, application Japan, Aug. 1, 1972, 47-77081**
**Int. Cl. B41c** *1/06*; **B41m** *5/18*
**U.S. Cl. 162—162** **19 Claims**

1. A heat or pressure sensitive copying paper containing a fluoran compound as a color former, said color being developed in said heat or pressure sensitive copying paper through the application of heat or pressure, said fluoran compound being of the formula

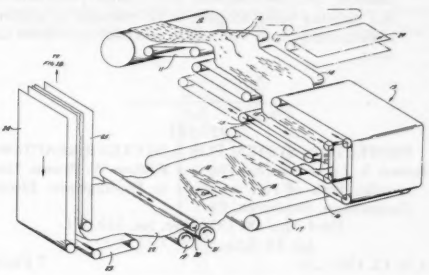


wherein $R_1$ is halogen; $R_2$ is hydrogen or methyl; $R_3$ is hydrogen, methyl or ethyl; each of $R_4$ is independently halogen or methyl; $R_5$ is methyl or ethyl; and $n$ is 0 or an integer from 1 to 4.

## 3,920,511
## NON-WOVEN PAPERMAKERS FELT

**Lowell G. Grieves, Lacon, Ill., and William S. Wightman, Niskayuna, N.Y., assignors to Albany International Corporation, Albany, N.Y.**

**Division of Ser. No. 205,009, Dec. 6, 1971, abandoned. This application July 16, 1973, Ser. No. 379,321**
**Int. Cl. B32b** *5/06*; **D04h** *18/00*
**U.S. Cl. 162—348** **1 Claim**



1. A non-woven papermakers felt which comprises a substrate formed of a plurality of lapped layers of webs of fibers oriented substantially in the direction of felt travel and which have been consolidated into a homogeneous mass in the absence of bonding and stitching by consecutive needling operations wherein the weight of the substrate is within the range of 180 grains per square foot to 225 grains per square foot; and a web of fibers needled into said substrate substantially crosswise of said felt travel.

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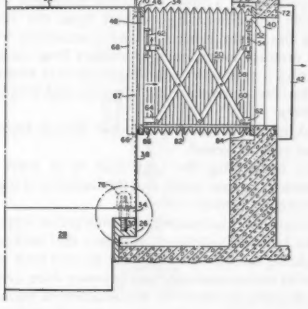
## 3,920,512
## SHIELD PLUG ACCESS ENCLOSURE FOR A NUCLEAR REACTOR

**John D. Sutherland, Monroeville, Pa., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.**

**Continuation of Ser. No. 114,629, Feb. 11, 1971, now Defensive Publication No. 901,028. This application Apr. 17, 1973, Ser. No. 351,923**
**Int. Cl. G21c** *19/20*
**U.S. Cl. 176—87** **3 Claims**



1. Apparatus for providing access to the immediate environs of a liquid metal cooled nuclear reactor comprising, in combination:
a sealed chamber having side walls, a ceiling, and a floor, said chamber being filled with an inert gas, said chamber further having an opening in a side wall thereof;
a nuclear reactor including a pressure vessel, a head closure removably sealed to said pressure vessel, and control rod drive mechanisms mounted on said closure head, said

nuclear reactor being sealed in and through the floor of said chamber with the pressure vessel extending downwardly therefrom;

an access enclosure within said sealed chamber and forming a sealed enclosure over said reactor, closure head, and mechanisms, said access chamber having an opening, normally closed by a door, therein substantially opposite the opening in the chamber; and

a bellows-like member sealed over said opening in said chamber and extending into said chamber, said bellows-like member being adapted to be extended to and into sealing engagement with said access enclosure about said door.

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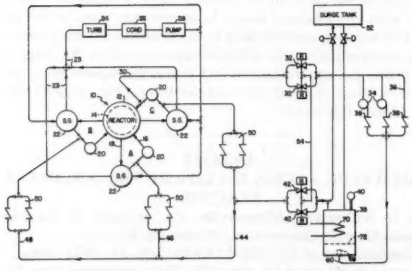
**3,920,513**

## PROTECTION SYSTEM FOR A NUCLEAR REACTOR

**Robert A. Loose, Murrysville, and William W. Brown, Monroeville, both of Pa., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.**

**Filed Apr. 18, 1973, Ser. No. 352,371**
**Int. Cl. G21c** *7/36, 7/32, 7/22*
**U.S. Cl. 176—20** **7 Claims**




1. A reactor coolant cooldown protection system for a nuclear reactor power plant which includes a reactor vessel having multiple primary coolant loops, each loop containing piping connecting a pump and steam generator with the reactor vessel for circulating coolant from the reactor vessel through the steam generator, and a secondary loop for each of said primary loops, each secondary loop including piping connecting a secondary side of one of said steam generators with a turbine, condenser and a pump, said protection system comprising:

a tank having a neutron absorber therein located adjacent said reactor vessel;

means connecting the tank inlet to at least one of said primary coolant loops, and the outlet to at least one of the remaining primary loops;

isolation valves respectively connected on opposite sides of said tank for selectively isolating said tank; and

equalizing means connected across said tank inlet and outlet for accommodating any pressure drop across said tank to thereby preclude the introduction of liquid of different chemistry into said tank or the discharge of neutron absorber therefrom into one of said loops in the event of valve leakage;

whereby as abnormal conditions arise requiring the injection of neutron absorber into the reactor vessel, the isolation valves are opened and primary coolant from the reactor is pumped by a primary coolant pump into the tank to force the neutron absorber therein directly into at least one of said remaining reator primary loops and thereby provide negative reactivity to said reactor.

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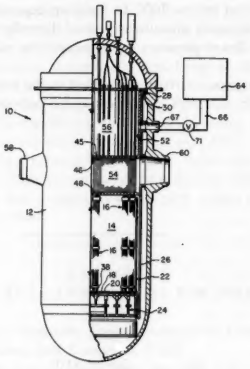
**3,920,514**

## EMERGENCY CORE COOLING SPRAY HEAD

**John Norman Calvin, West Simsbury, Conn., assignor to Combustion Engineering, Inc., Windsor, Conn.**

**Filed Oct. 18, 1973, Ser. No. 407,692**
**Int. Cl. G21C** *15/18*
**U.S. Cl. 176—38** **6 Claims**



1. A nuclear reactor comprising:

a. a substantially closed upstanding vessel,

b. a pair of vertically spaced tube sheets dividing the interior of said vessel into axially spaced sections including a core region, an outlet plenum and an inactive plenum,

c. a reactive core in said core region including a plurality of fuel assemblies each containing upper and lower end fittings, elongated hollow guide tubes attaching said end fittings in axially spaced relation and parallel fuel elements extending between said end fittings,

d. means for circulating coolant fluid through said core during periods of normal reactor operation, and

e. means for supplying emergency coolant fluid to said core in the event of a plant accident, said means including:

i. a source of emergency coolant fluid disposed externally of said vessel,

ii. duct means connecting said source with said inactive plenum,

iii. a plurality of tubular connectors extending through said outlet plenum with their upper and lower ends attaching said tube sheets and communicating with said inactive plenum and said core region respectively,

iv. plate means integral with each of said fuel assemblies forming enclosed plenums each having a transverse extent at least as great as that of the periphery of the associated fuel element bundle,

v. said hollow guide tubes penetrating said plenums and having their upper ends communicating with said tubular connectors,

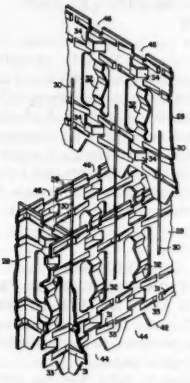
vi. means forming openings in said guide tubes for connecting said plenums in fluid communication with tubular connectors, and

vii. means forming openings in said plate means for the discharge of emergency coolant fluid from said plenums.

## 3,920,515
## FUEL ASSEMBLY FOR A NUCLEAR REACTOR

**Harry M. Ferrari, Edgewood; Douglas L. Miller, and Long S. Tong, both of Pittsburgh, all of Pa., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.**

**Filed Sept. 26, 1972, Ser. No. 292,379**
**Int. Cl. G21c** *3/34*
**U.S. Cl. 176—78** **5 Claims**



1. A fuel assembly for a nuclear reactor comprising:
an array of fuel rods mounted between a base and an upper support member;
at least one open channel grid positioned on said assembly for laterally supporting and holding said fuel rods in spaced relationship with each other;
said open channel grid comprising multiple straps interwoven with each other to form a grid of egg-crate configuration which forms openings for reception of said fuel rods; resilient means formed integral with said straps and projecting from adjacent straps into each opening to contact a fuel rod therein:
rigid means projecting from the other adjacent straps into each opening to contact the remaining sides of said fuel rod and impart lateral support thereto; each of said rigid means comprising sections of a grid strap deformed inwardly to form a dimple having an opening extending axially of said grid so that liquid coolant flowing through said grid and along the fuel rod length moves in a substantially uninterrupted path past said dimples; and
multiple first cutout sections on the leading edges of each said straps disposed adjacent to and in axial alignment with each of said rigid means to, said multiple first cutout sections defining a serrated configuration help avoid the build up of a boundary layer of coolant around each fuel rod.

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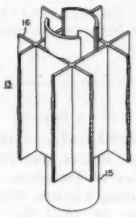
## 3,920,516
## NUCLEAR REACTOR FUEL ASSEMBLY ARRANGEMENT

**Stanley Kmonk, Pittsburgh, and David J. Sperhac, West Homestead, both of Pa., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.**

**Filed Sept. 25, 1972, Ser. No. 292,240**
**Int. Cl. G21c** *3/34*
**U.S. Cl. 176—78** **5 Claims**

1. A fuel assembly for a nuclear reactor including an array of generally parallel elongated fuel rods,
a plurality of elongated structural members, said structural members having an axial opening therethrough and being made of a metal having low neutron capture cross section,
support plate members located at opposite sides of said fuel rods and structural members for providing support thereto,
at least one member spaced along the length of said structural tube members, said grid member comprising coacting straps defining openings through which said structural members and said fuel rods extend, and
retaining means positioned within said openings between the structural members and the strap walls of said grid member,
each of said retaining means comprising a hollow sleeve member having an outer diameter slightly greater than



the distance between the opening defined by said straps, windows in said sleeve member which receive said straps when the sleeve member is positioned in said opening, and
said sleeve member having elastically deflectable sections formed by slotted means which permit sleeve member deflection in a radial direction to allow insertion of the sleeve member in said opening,
whereby upon insertion and release of the sleeve member end, the sleeve member windows snap over the edges of said straps thereby immovably locking the sleeve member in the grid member opening.

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## 3,920,517
## NUCLEAR REACTOR FUEL ASSEMBLY

**Youichi Sasaki, and Junichiro Tashima, both of Yokohama, Japan, assignors to Tokyo Shibaura Electric Co., Ltd., Kawasaki, Japan**

**Filed June 30, 1971, Ser. No. 158,223**
**Claims priority, application Japan, June 30, 1970, 45-64660**
**Int. Cl.**[2] **G21C** *3/32*
**U.S. Cl. 176—78** **5 Claims**

1. In a fuel assembly for a nuclear reactor having a reactor core comprising cells containing fuel rods supported by tie plates at both upper and lower ends arranged in groups within said cells defined as substantially square compartments by an upper support frame member, each cell comprising four columnar channels having a substantially square cross section enclosing a plurality of fuel rods, said four channels of a cell presenting mutually facing walls, the improvements which

comprises an elastic member fitted at the upper end of said assembly that acts to elastically press said channels of a cell against said upper support frame member, said elastic member comprising plate springs fitted to said mutually facing walls to extend downwardly respectively from one corner of the upper ends of said side walls, said plate springs being arranged in pairs, one spring of a pair having a concave surface curved toward the corresponding side wall of the channel to which it is fitted and a flat lower end that engages said side wall substantially in parallel relationship, the other spring of the pair having a convex surface curved away from the corresponding side wall of the channel to which it is fitted and a flat lower end that is disposed apart from its corresponding side wall in parallel relationship, said elastic member enabling the channels of a cell of the reactor core to be rigidly set in place by elastic engagement between the plate springs of the elastic member.

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**3,920,518**

## PRESSURE VESSELS HAVING THERMAL INSULSATION

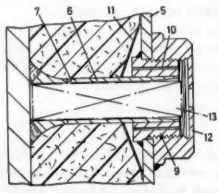
**Jean Brissaud, Paris, France, and William Birch, Knutsford, England, assignors to Technigaz, Paris, France and The Nuclear Power Group Limited, England**

**Filed Oct. 26, 1972, Ser. No. 301,255**

**Claims priority, application United Kingdom, Oct. 26, 1971, 49771/71**

**Int. Cl. G21c** *11/00*

**U.S. Cl. 176—87** **3 Claims**




1. A nuclear reactor pressure vessel having an inner wall and a thermal barrier system on the inner wall, the thermal barrier system including a metal liner coextensive with and applied to the inner wall of the vessel, an impervious metal membrane spaced from said liner in substantially parallel relationship thereto, heat-resistant insulation contained in the space between the liner and the membrane, tubular studs secured to the membrane and liner whereby the membrane compresses the heat-resistant insulation to the liner, said membrane having flexible corrugated portions, said flexible corrugated portions being of lesser cross section than the cross section of the major portion of said membrane, each of said studs comprising a hollow body having an inner end and a mouth located exteriorly of the membrane, an impact collar surrounding said hollow body, said collar being of such length as to extend into the space between the liner and membrane and terminate adjacent the mouth of the hollow body, said collar having passages extending axially therethrough to provide fluid communication between the insulation and the interior of the hollow body, means within the space adjacent the inner end of the collar for preventing egress of the insulation, and a cap attached to the collar whereby there is provided a tortuous extension of said passages for providing maximum attenuation of high-sound pressure levels prevailing within the reactor and avoiding acoustic damage to the insulation.

**3,920,519**

## ENZYMATIC HYDROLYSIS OF RIBONUCLEIC ACID

**Yuh Norimoto, 1-2, Kyowa-cho, Hofu, Yamaguchi; Shigeru Ohmura, 543, Negoya, Numazu, Shizuoka; Yoshiaki Shimizu, and Toshio Tatano, both of 1188, Shimotogari, Nagaizumi-cho, Sunto, Shizuoka, all of Japan**

**Filed Feb. 11, 1974, Ser. No. 441,309**

**Claims priority, application Japan, Feb. 14, 1973, 48-17449; Mar. 24, 1973, 48-33088**

**Int. Cl.² C12D** *13/06*

**U.S. Cl. 195—28 N** **19 Claims**

1. A process for producing nucleoside 2′, 3′-cyclic phosphates and nucleoside 3′, 5′-cyclic phosphates which comprises reacting ribonucleic acid with intact cells of a microorganism having a ribonuclease activity in an aqueous reaction medium which includes a source of phosphate ion, in the presence of a chelating agent to enzymatically hydrolyze ribonucleic acid into nucleoside 2′, 3′-cyclic phosphates and nucleoside 3′, 5′-cyclic phosphates and isolating the nucleoside 2′, 3′-cyclic phosphates and nucleoside 3′, 5′-cyclic phosphates from the resulting aqueous medium.

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**3,920,520**

## FERMENTATION PROCESS FOR PRODUCING OPTICALLY ACTIVE L-LYSINE

**Tutomu Tanaka; Tamotsu Hirakawa, and Kenji Takahara, all of Hyogo, Japan, assignors to Kanegafuchi Chemical Industries Co., Ltd., Osaka, Japan**

**Filed Aug. 7, 1974, Ser. No. 495,474**

**Claims priority, application Japan, Aug. 7, 1973, 48-89135**

**Int. Cl.² C12D** *13/06*

**U.S. Cl. 195—30** **15 Claims**

1. A fermentation process for producing L-lysine which comprises aerobically cultivating an L-lysine producing mutant strain of a microorganism belonging to the Genus Acinetobacter in a culture medium containing a carbon source assimilable by said microorganism until a substantial amount of L-lysine is accumulated in the culture medium and recovering the thus accumulated L-lysine from the culture medium.

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**3,920,521**

## SUPEROXIDE DISMUTASES AND THEIR APPLICATIONS AS OXIDATION INHIBITORS

**Adolf Michael Michelson, Chatenay-Malabry, and Jacques Monod, Paris, both of France, assignors to Agence Nationale de Valorisation de la Recherche (ANVAR), Neuilly-sur-Seine, France**

**Filed Apr. 16, 1974, Ser. No. 461,426**

**Claims priority, application France, Aug. 10, 1973, 73.29328**

**Int. Cl.² A23L** *3/00*

**U.S. Cl. 195—55** **16 Claims**

1. A process to control auto-oxidation of substances liable to be degraded by oxidation with superoxide ions, wherein an anti-oxidation effective amount of at least one superoxide dismutase enzyme is added to said substances.

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**3,920,522**

## COMPOSITION OF MATTER AND PROCESS

**Alexander D. Argoudelis, Portage; John H. Coats, and Oldrich K. Sebek, both of Kalamazoo, all of Mich., assignors to The UpJohn Company, Kalamazoo, Mich.**

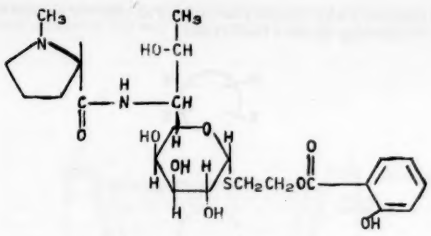
**Division of Ser. No. 215,119, Jan. 3, 1972, Pat. No. 3,817,979. This application Dec. 13, 1973, Ser. No. 424,462**

*Disclosure was also published under Trial Voluntary Protest Program on Jan. 28, 1975.*

**Int. Cl.² C12D** *9/00*

**U.S. Cl. 195—80 R** **3 Claims**

1. A process for preparing 7-0-demethylcelesticetin having the structural formula:



which comprises cultivating *Streptomyces caelestis* strain 22227a, having the cultural characteristics of culture deposit NRRL 5320, in an aqueous nutrient medium under aerobic conditions until substantial antibiotic activity is imparted to said medium by the production of 7-0-demethylcelesticetin.

**3.** A process according to claim **1** wherein said produced 7-0-demethylcelesticetin is isolated from the fermentation medium by a process which comprises:

a. filtering the fermentation whole broth to obtain filtered beer;

b. passing the filtered beer over a resin comprising a non-ionic macro porous copolymer of styrene crosslinked with divinylbenzene;

c. eluting said resin with a solvent selected from the group of organic or aqueous organic solvents in which 7-0-demethylcelesticetin is soluble to obtain eluates; and

d. subjecting said eluates to chromatographic procedures to recover 7-0-demethylcelesticetin.

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## 3,920,523
## THIN FILM EVAPORATION OF A CRUDE AMIDE FEED IN MIXTURE WITH AN ALKALI METAL HYDROXIDE

**Glen D. Lichtenwalter, Hinsdale, and Sheldon D. Carlson, Woodridge, both of Ill., assignors to Akzona Incorporated, Asheville, N.C.**

**Filed Nov. 21, 1972, Ser. No. 308,639**

**Claims priority, application Japan, Mar. 17, 1971, 46-10533**

**Int. Cl. B01d** *3/34*

**U.S. Cl. 203—37** **8 Claims**

**1.** Method for the purification of an impure fatty acid amide containing from 14 to 22 carbon atoms and containing free fatty acids as impurities, comprising the steps of:

a. neutralizing said free fatty acids with an alkali to produce a neutralized fatty acid amide;

b. subjecting the neutralized amide to molecular distillation in a wiped-film evaporator by maintaining said amide in the form of a thin film having a thickness less than about 1 mm. on a distillation surface heated at or above the boiling temperature of said amide at the operating pressure of said distillation, for a short residence time of between about 1 and about 10 seconds, while distilling said amide from said surface at a reduced pressure between about 0.005 and about 5 mm. mercury, condensing and collecting the vaporized amide on a condenser, the neutralized fatty acid impurities not being distilled; and

c. recovering the purified fatty acid amide.

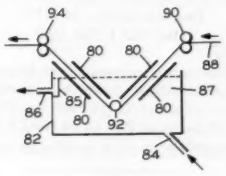
## 3,920,524
## METHOD FOR HIGH SPEED CONTINUOUS ELECTROPLATING USING PLATINUM CLAD ANODE ASSEMBLY

**Orris A. Rogers, Woodbury; Eldridge K. Camp, Northfield, and John P. Borgmann, Naugatuck, all of Conn., assignors to American Chemical & Refining Company, Inc., Waterbury, Conn.**

**Division of Ser. No. 308,478, Nov. 21, 1972, Pat. No. 3,856,653. This application Nov. 12, 1974, Ser. No. 523,126**

**Int. Cl.² C25D** *7/06, 5/04*

**U.S. Cl. 204—28** **6 Claims**




**1.** A method for the high speed continuous electroplating of an elongated workpiece comprising the steps of:

providing an electroplating tank adapted to permit the flow therethrough of electroplating solution and the movement therethrough of an elongated workpiece;

circulating through said electroplating tank an electroplating solution containing ions of a metal to be plated and an electrolyte forming an inert coating upon tantalum;

transporting any elongated workpiece through said electroplating solution with said electroplating tank;

maintaining adjacent said workpiece within said electroplating solution at least one anode assembly including an elongated tantalum mesh clad with platinum on the surface thereof adjacent said workpiece, an elongated electrically conductive framework supporting and conductively bonded to said mesh on the other surface thereof, and a current distribution subassembly generally insulated from said framework but selectively conductively bonded thereto at a plurality of spaced points intermediate the ends of said framework; and

applying a potential between said workpiece and said anode assembly to provide a uniform current distribution with variations of less than **20** per cent across said mesh surface and thereby to electroplate the metal ion of said electroplating solution onto said workpiece.

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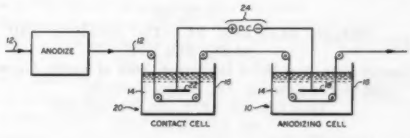
## 3,920,525
## PROCESS FOR CONTINUOUSLY ANODIZING ALUMINUM

**Howard A. Fromson, 15 Rogues Ridge Road, Weston, Conn. 06880**

**Continuation-in-part of Ser. No. 361,720, May 18, 1973, Pat. No. 3,865,700. This application Dec. 11, 1974, Ser. No. 531,638**

**Int. Cl.² C25D** *7/00, 5/00*

**U.S. Cl. 204—28** **4 Claims**




**1.** In a process for continuously electrolytically anodizing aluminum, the improvement which comprises introducing

anodizing direct current into said aluminum in a cathodic contact cell, said aluminum having an anodized oxide coating formed thereon before entering said cell.

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### 3,920,526
### PROCESS FOR THE ELECTRODEPOSITION OF DUCTILE PALLADIUM AND ELECTROPLATING BATH USEFUL THEREFOR

**Jerome J. Caricchio, Jr., Binghamton; George J. Saxenmeyer, Jr., Apalachin, and Edward R. York, Endicott, all of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.**

**Filed Mar. 12, 1974, Ser. No. 450,499**

*Disclosure was also published under Trial Voluntary Protest Program on Jan. 28, 1975.*

**Int. Cl.[2] C25D** *3/50*

**U.S. Cl. 204—47** **15 Claims**

1. An aqueous electrodeposition bath for electrodepositing non-porous, ductile palladium which comprises:
from about 16 to about 32 g/l $Pd(NH_3)_2Cl_2$;
from about 65 to about 250 g/l of $NH_4Cl$; and
aqueous ammonia to provide a pH of at least about 8.8.

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### 3,920,527
### SELF-REGULATING PLATING BATH AND METHOD FOR ELECTRODEPOSITING CHROMIUM

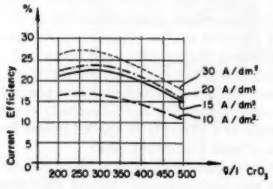
**Manfred Dettke, and Manfred Roosen, both of Berlin, Germany, assignors to Schering AG, Berlin & Bergkamen, Germany**

**Filed Jan. 22, 1969, Ser. No. 792,970**

**Claims priority, application Germany, Feb. 3, 1968, 1696088**

**Int. Cl. C23b** *5/06*

**U.S. Cl. 204—51** **8 Claims**




1. A method for forming a microcracked chromium electrodeposit which comprises making an electrically conductive object the cathode in a self-regulating acidic aqueous chromium electroplating electrolyte comprising between 200 and 400 grams per liter of chromium trioxide, lead sulfate in amounts of from 0.5 to 10 percent by weight based on the concentration of chromium trioxide, and an effective amount of a secondary activator selected from the group consisting of the anions of hydrofluoric acid, fluosilicic acid, fluoboric acid, and fluotitanic acid, said effective amount being sufficient to contribute to the production of a microcracked chromium deposit, at a temperature of 25°C. to 60°C. and at a cathode current density of 5 to 70 amps. per square decimeter.

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### 3,920,528
### BRIGHT ACID ZINC PLATING METHOD AND ELECTROLYTE

**Gunter Voss, and Helga Hoffmann, both of Berlin, Germany, assignors to Schering AG, Berlin, Germany**

**Filed Oct. 25, 1973, Ser. No. 409,694**

**Int. Cl.[2] C25D** *3/22*

**U.S. Cl. 204—55 R** **9 Claims**

1. In an acid zinc electroplating electrolyte including a source of zinc ions, an inert salt for improving the conductivity of the electrolyte, and a brightener, the improvement in the brightener which consists essentially of an effective amount of a brightening agent of the formula

wherein

is the heterocyclic ring of pyridine, quinoline, isoquinoline, pyrrol, piperidine, pyrrolidine, or pyrrolidone,
W is $-COOH$, $-SO_3H$, $-(CH_2)_nCOOH$, $-C_2H_3COOH$, $-CO-COOH$, or $-C_6H_4-COOH$,
$n$ is 1, 2, or 3,
X is hydrogen, carboxyl, lower alkyl, or vinyl,
Y is hydrogen, hydroxyl, methyl, or methoxy, and
Z is hydrogen or methyl the electrolyte being substantially free from complexing agents capable of impeding precipitation of said zinc ions from said electrolyte when the electrolyte is made weakly alkaline.

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### 3,920,529
### CONTROL OF ALKALI METAL CHLORATES IN MERCURY CELL BRINE

**Ernest H. Sprague, Augusta, Ga., assignor to Olin Corporation, New Haven, Conn.**

**Filed May 28, 1974, Ser. No. 473,620**

**Int. Cl.[2] C25B** *1/26*

**U.S. Cl. 204—128** **11 Claims**

1. In a process for preparing chlorine by electrolysis wherein
a. an aqueous brine of an alkali metal chloride is electrolyzed to produce
1. chlorine and
2. a depleted brine,
b. said depleted brine is admixed with an alkaline compound to form an alkaline brine, and
c. an uncondensed blow-off gas containing chlorine is separated from said chlorine,
d. the resulting alkaline brine is resaturated with said alkali metal chloride,
e. and after separation of the resulting solids from the saturated brine, at least a portion of said alkaline saturated brine is admixed with said blow-off gases to recover chlorine therefrom,
the improvement which comprises
adjusting the pH of said alkaline depleted brine to within the range of from about 7.5 to about 8.5 prior to said saturation.

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### 3,920,530
### FLOTATION PROCESS

**Kurt Xylander, Goethestrasse 9, D-6234 Hattersheim, Germany**

**Filed July 10, 1974, Ser. No. 487,193**

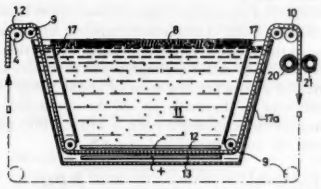
**Claims priority, application Germany, June 24, 1974, 2430244**

**Int. Cl.[2] C02C** *5/12, 1/26;* **C02B** *1/82, 1/10*

**U.S. Cl. 204—152** **23 Claims**

1. A process for purifying an aqueous liquid which includes the step of producing bubbles by electrolysis between at least one pair of electrodes for flotation of suspended solids by said

bubbles produced by said electrolysis wherein the improvement comprises the step of moving at least one of said elec-




trodes within said liquid while said electrolysis and flotation are occurring.

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**3,920,531**

**PREPARATION OF DERIVATIVES OF CHOLESTEROL**

**Yehuda Mazur, 14 Haknesset Hagdola St., Tel-Aviv, and Avner Rotman, 8 Hagoren St., Rehovot, both of Israel**

**Filed Mar. 25, 1974, Ser. No. 454,394**

**Claims priority, application Israel, Apr. 1, 1973, 41923**

**Int. Cl.[2] B01J** *1/10*

**U.S. Cl. 204—157.1 R** **5 Claims**

1. A process for producing hydroxylated derivatives of cholesterol and 7-dehydrocholesterol, which comprises subjecting a saturated unsubstituted or substituted derivative of cholestane, dissolved in a suitable solvent, in the presence of peracetic acid, to irradiation with ultra-violet light having a wavelength of less than 350 m$\mu$, separating the products of the reaction and recovering the residue of the starting material.

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**3,920,532**

**PROCESS FOR ELECTRODEPOSITION OF A DISPERSION OF FINELY DIVIDED SUBSTANCES IN AN APOLAR DISPERSING AGENT**

**Norbert Ernst Fritz Hansen, and Siegfried Stotz, both of Aachen, Germany, assignors to U.S. Philips Corporation, New York, N.Y.**

**Division of Ser. No. 43,223, June 3, 1970, Pat. No. 3,766,125. This application July 6, 1973, Ser. No. 377,068**

**Claims priority, application Germany, June 6, 1969, 1928817**

**Int. Cl.[2] C25D** *13/10, 13/12*

**U.S. Cl. 204—181** **2 Claims**

1. In an electrophoretic method of manufacturing luminescent picture screens the improvement which comprises employing a dispersion in a mixture of isoparaffins apolar dispersing agents having an electrical conductivity of less than $10^{-14}$ $\Omega^{-1}$ cm.$^{-1}$ of finely divided particles capable of being deposited on an electrode by electrophoresis and having a particle size of about 0.01–10 $\mu$m, at least one surface-active ion-forming substance, said surface-active ion-forming substance being soluble in said dispersing agent, having a dissociation capacity such that its electrical conductivity in a $10^{-3}$ molecular solution lies between about $1 \times 10^{-10}$ and $1 \times 10^{-1}$ $\Omega^{-1}$ cm.$^{-1}$ and comprising bivalent and multivalent ions and a soluble nonionic macro-molecular compound having at least one side chain of at least 4 carbon atoms.

**3,920,533**

**LIGHT FILTER AND PROCESS FOR PRODUCING THE SAME**

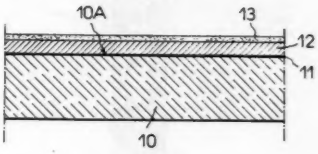
**Jean Pompéi, Noisy-le-Roi, France, assignor to R.T.C. La Radiotechnique-Compelec, Suresnes, France**

**Filed Apr. 10, 1974, Ser. No. 459,827**

**Claims priority, application France, Apr. 12, 1973, 73.13277**

**Int. Cl. C23c** *15/00;* **B29d** *11/00*

**U.S. Cl. 204—192** **6 Claims**




1. A cathodic spraying process for the production of a body which is relatively transmissive to radiant energy incident thereon over at least a portion of the luminous part of the electromagnetic spectrum and which is relatively non-transmissive to radiant energy incident thereon over at least a portion of the non-luminous part of the electromagnetic spectrum comprising the steps of:

positioning a transparent substrate body on a collecting electrode in an enclosed volume;

successively advancing the collecting electrode between first and second target electrodes, wherein said first target electrode is formed of an alloy consisting of about between 90 and 98 percent gold and about 2 to 10 percent bismuth by weight and said second target electrode consists essentially of indium, the collecting electrode and the target electrodes are separated by a distance in the range of about 50 to 70 mm, a potential difference in the range of about 500to 70 mm, a potential differencne in the range of about 2,000 to 4,000 volts DC is applied between target and collector electrodes, and a pressure in the range of $1 \times 10^{-2}$ to $1 \times 10^{-3}$ torr is established in the enclosed volume in which said cathodic spraying occurs.

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**3,920,534**

**ION EXCHANGE MEMBRANE - CATHODE CARTRIDGE FOR AN ELECTROLYTIC CELL**

**Gerald A. Jensen, Wayzata, Minn., and Harry N. Parsonage, Washington Township, Montgomery County, Ohio, assignors to The Mead Corporation, Dayton, Ohio**

**Division of Ser. No. 420,699, Nov. 30, 1973, Pat. No. 3,891,532. This application Sept. 20, 1974, Ser. No. 507,731**

**Int. Cl.[2] C25B** *13/00*

**U.S. Cl. 204—282** **3 Claims**

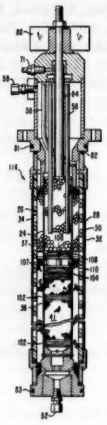
1. A modular cartridge for use in an apparatus for conducting an electrolytic chemical reaction comprising

a porous, synthetic plastic, tubular support member,

a woven fiberglass mat, overlying the exterior surface of said support member,

an ion exchange membrane overlying said fiberglass mat,

and
a nylon cord wrapped around said membrane, mat and



member and holding said membrane and mat in position against said member.

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**3,920,535**

**BIPOLAR ELECTRODE**

**Robert F. Schultz, Niagara Falls, and Edward H. Cook, Jr., Lewiston, both of N.Y., assignors to Hooker Chemicals & Plastics Corporation, Niagara Falls, N.Y.**

**Filed May 25, 1973, Ser. No. 363,929The portion of the term of this patent subsequent to July 30, 1991, has been disclaimed.**

**Int. Cl. B01k** *3/04*

**U.S. Cl. 204—290 F** **10 Claims**

1. A bipolar electrode consisting of a core of a valve metal, at least a portion of the anodic surface of which is conductively covered by at least one anodic material selected from the group consisting of platinum group metals and platinum group metal oxides, a barrier layer of silicon on the cathodic side of the valve metal core and at least a portion of the exterior surface of the silicon barrier layer being covered by at least one cathodic material selected from the group consisting of steel, copper, chromium, cobalt, nickel and iron.

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**3,920,536**

**COAL DISSOLVING PROCESS**

**Walter H. Seitzer, West Chester, and Robert W. Shinn, Aston, both of Pa., assignors to Sun Research and Development Co., Marcus Hook, Pa.**

**Continuation-in-part of Ser. No. 250,999, May 8, 1972, abandoned. This application Jan. 15, 1973, Ser. No. 323,568**

*Disclosure was also published under Trial Voluntary Protest Program on Jan. 28, 1975.*

**Int. Cl. C10g** *1/06*

**U.S. Cl. 208—10** **6 Claims**

1. The process for dissolving sub-bituminous coal which comprises heating at about 400°C. to about 425°C. under a total pressure of from about 2000 to about 5000 psig, a mixture of said finely divided coal, a hydrogen donor oil in a weight ratio to said coal of from about 1:1 to 5:1, carbon monoxide, hydrogen in an amount such that its partial pressure is about the same as that of said carbon monoxide, water in an amount such that the molar ratio of water to carbon monoxide is from about 2:1 to 1:2, and as a promoter, an alkali metal or ammonium molybdate in an amount of from about 0.5 to about 10% by weight of said coal.

**3,920,537**

**PROCESS FOR ON-STREAM DECOKING OF VAPOR LINES**

**John H. Walker, Bakersfield, Calif., assignor to Toscopetro Corporation, Bakersfield, Calif.**

**Filed June 5, 1974, Ser. No. 476,725**

**Int. Cl.² C10G** *9/16*

**U.S. Cl. 208—48 R** **9 Claims**

1. A process of removing coke deposits from hydrocarbon vapor conduits while continuously passing hydrocarbon vapors through the conduit which comprises contacting the coke deposit with a jet of relatively high pressure water, said water being jetted at a pressure in excess of about 5,000 psi, and at a rate sufficient to thermally shock the contacted coke deposit, whereby the contacted coke is broken into pieces and blown from the conduit.

ALH JLW (12209) PDH

**3,920,538**

**DEMETALLATION WITH NICKEL-VANADIUM ON SILICA IN A HYDROCARBON CONVERSION PROCESS**

**Karel M. A. Pronk, and Swan T. Sie, both of Amsterdam, Netherlands, assignors to Shell Oil Company, Houston, Tex.**

**Filed Oct. 3, 1974, Ser. No. 511,867**

**Claims priority, application Netherlands, Nov. 30, 1973, 7316396**

**Int. Cl.² C10G** *23/02*

**U.S. Cl. 208—89** **10 Claims**

1. In a process for the catalytic conversion of a residual hydrocarbon oil, in which process the oil is first demetallized and subsequently catalytically converted and in which the demetallization is carried out by contacting said oil at a temperature of 350°–450°C, a total pressure of 75–250 bar, a space velocity of 0.1–25 pbv of fresh feed per pbv of catalyst per hour with hydrogen at a hydrogen/feed ratio of 100–2000 Nl $H_2$/kg feed and with a catalyst comprising 0.1–15 parts by weight of nickel and vanadium metals the oxides or sulfides thereof per 100 parts by weight of silica carrier, said catalyst meeting the following requirements:

the quotient $p/d$ is greater than $3.5–0.02v$, in which p is the specific average pore diameter in nm, $d$ is the specific average particle diameter, said particle diameter being between 0.4 to 5.0 mm, and v is the percentage of the total pore volume that consists of pores with a diameter larger than 100 nm; and

a. when the quotient $p/d$ is greater than $10.0–0.15v$, the total pore volume is larger than 0.40 ml/g, v is smaller than 50, the surface area is larger than 100 $m^2/g$ and p is larger than 5 nm; and

b. when the quotient $p/d$ is at most $10–0.15v$, the nitrogen pore volume is larger than 0.60 ml/g, the surface area is larger than 150 $m^2/g$, and p is larger than 5 nm, the improvement comprising said demetallization step being carried out with said catalyst which shows a loss on ignition, at 500°C for two hours, of less than 0.5% by weight.

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RJB

**3,920,539**

**HYDROCARBON HYDRODESULFURIZATION UTILIZING A CATALYST OF GERMANIUM GROUP VI- AND VIII COMPONENTS ON ALUMINA**

**Glen P. Hamner, and Willard H. Sawyer, both of Baton Rouge, La., assignors to Exxon Research & Engineering Co., Linden, N.J.**

**Filed Apr. 19, 1974, Ser. No. 462,437**

**Int. Cl.² C10G** *23/02*

**U.S. Cl. 208—216** **3 Claims**

1. A process for the hydrodesulfurization of a hydrocarbon feedstock comprising contacting said feedstock, at hydrodesulfurization conditions with a catalyst composite said composite having been prepared by drying and calcining a cogel of alumina with a hydrogenation component, said hydrogenation component comprising from about 5 to about 50 weight % of molybdenum or tungsten, or compounds thereof, from

about 1 to about 12 weight % of nickel or cobalt, or compounds thereof, and from about 0.01 to about 10 weight % of germanium, or compounds thereof, measured as oxides.

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## 3,920,540
## METHOD OF TREATING OILS TO REMOVE CONTAMINANTS OF SULFUR NITROGEN AND COLOR BODIES

**Frederic C. McCoy, Beacon, and John T. Brandenburg, Hopewell Junction, both of N.Y., assignors to Texaco Inc., New York, N.Y.**

**Filed Apr. 3, 1973, Ser. No. 347,532**
**Int. Cl.[2] C10G** *29/04*
**U.S. Cl. 208—248** **26 Claims**

**1.** The method of increasing the viscosity index of a charge petroleum lubricating oil which comprises

passing said charge petroleum oil at 50°F-300°F into contact with a film consisting essentially of alumina on a metallic steel wool support whereby an improved product oil is formed having an increased viscosity index; and

withdrawing said improved product oil of increased viscosity index.

**2.** The method of desulfurizing a charge petroleum oil which comprises

passing said charge petroleum oil at 50°F-300°F into contact with a film consisting essentially of alumina on a metallic steel wool support whereby an improved desulfurized product oil is formed; and

withdrawing said improved desulfurized product oil.

**3.** The method of removing nitrogen components from a charge petroleum oil which comprises

passing said charge petroleum oil at 50°F–300°F into contact with a film consisting essentially of alumina on a metallic support whereby an improved product petroleum oil is formed containing reduced amounts of nitrogen; and

withdrawing said improved product petroleum oil containing reduced amounts of nitrogen.

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## 3,920,541
## PICK-OFF MECHANISM FOR CAPSULE INSPECTION MACHINE

**Willard J. VandenBerg; Robert E. Ramsey; George Pieczko, all of Indianapolis; Robert L. Bollman, Mooresville, and Richard E. Krackenberger, Beech Grove, all of Ind., assignors to Eli Lilly & Company, Indianapolis, Ind.**

**Filed May 13, 1974, Ser. No. 469,357**
**Int. Cl.[2] B07C** *1/02*
**U.S. Cl. 209—74 R** **12 Claims**

**1.** A pick-off mechanism for a capsule classifying machine or the like having a carrier on which capsules to be classified are carried in spaced relation along a path, comprising

a pick-off wheel having capsule receiving seats about its periphery and rotatable to carry capsules on said seats in a classification path,

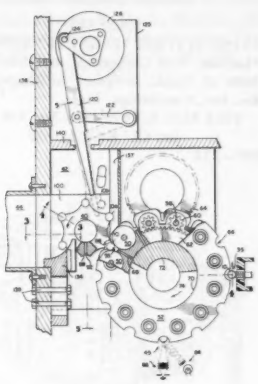
means to drive the wheel in timed relation with said carrier so as to present its seats successively in capsule-receiving position at a transfer station along said carrier path,

means to cause capsules to transfer from the carrier to the wheel seats at said station and suction means to retain the capsules on the seats as they are advanced by the wheel along said classification path,

a pick-off arm having a normal inactive position out of the classification path of capsules on said wheel and an active position in which it lies in such path at a first location so as to sweep a capsule of one class from the wheel at such location,

means at a second location along the path of capsules on the wheel to remove capsules of another class from the wheel at such second location,

and means to actuate said pick-off arm to its active position



as a capsule of said one class approaches said first location.

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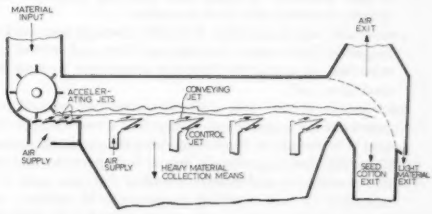
## 3,920,542
## REMOVAL OF GREEN BOLLS AND HEAVY MATERIALS FROM SEED COTTON BY AIR JETS

**Joseph W. Laird, and Roy V. Baker, both of Lubbock, Tex., assignors to The United States of America as represented by the Secretary of Agriculture, Washington, D.C.**

**Filed June 4, 1974, Ser. No. 476,235**
**Int. Cl.[2] B07B** *7/01*
**U.S. Cl. 209—134** **4 Claims**




**1.** An air jet apparatus for classifying materials said apparatus comprising:

a. an accelerating means for horizontally accelerating and conveying the materials which comprises a substantially horizontal, flat surface having a series of rows of louvered openings;

b. a separating means oriented in the same plane as the accelerating means comprising a plurality of air jet nozzles having spaces therebetween, each nozzle comprising an air plenum having ends and both upper and lower longitudinal sections, as well as means for securing said sections together and means for attaching said secured sections to said ends, means comprising two parallel slots in the upper section which communicate with the interior of said nozzle for producing converging air jets; said air jets converging in the direction at which said materials are conveyed by the accelerating means; and means connecting said nozzles for simultaneously pivoting said nozzles about an axis parallel to the slot; and

c. a collecting system located below the separating means and formed into the configuration of a trough having an open top communicating with the open spaces between the nozzles and a bottom sloped at an acute angle towards

a bottom opening communicating with a conveyor means for removal of waste material.

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**3,920,543**

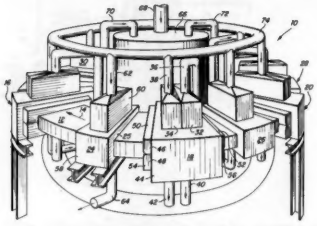
## MOVING MATRIX MAGNETIC SEPARATOR

**Peter G. Marston, East Gloucester, and John J. Nolan, Randolph, both of Mass., assignors to Magnetic Engineering Associates, Inc., Cambridge, Mass.**

**Filed Mar. 5, 1973, Ser. No. 338,176**

**Int. Cl.² B03C** *11/08*

**U.S. Cl. 209—222** **28 Claims**



1. A moving matrix magnetic separator comprising:

a magnetic pole unit including a first ferromagnetic pole member; a second ferromagnetic pole member aligned with and spaced from said first pole member; and a working magnetic field volume formed by the space between said first and second pole members;

electromagnetic coil means encircling said pole unit immediately adjacent said first and second pole members completely covering said magnetic field volume for producing a magnetic field proximate said field volume extending in a first direction through said working magnetic field volume between said pole members;

a moveable matrix member moveable through said working magnetic field volume between said first and second pole members in a second direction transverse to said first direction; and

inlet means in said pole unit proximate one of said pole members for introducing, in said first direction, between said pole members, fluid containing magnetically susceptible and non-magnetically susceptible particles through the portion of said matrix member between said pole members in said working magnetic field volume, and outlet means proximate the other of said pole members for removing containing fluid non-magnetically susceptible particles from said matrix member in said working magnetic field volume.

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**3,920,544**

## PROCESS AND INSTALLATION FOR THE TREATMENT OF WATER AND OTHER LIQUIDS

**Herbert Weiss, Gundelfingen, Germany, assignor to Abwassertechnik und Kunststoffbau GmbH, Waiblingen, Germany**

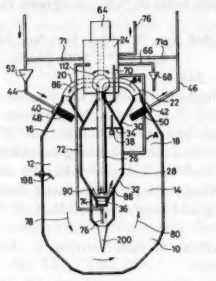
**Filed June 12, 1973, Ser. No. 369,144**

**Claims priority, application Germany, June 13, 1972, 2228657**

**Int. Cl.² B01D** *15/02*

**U.S. Cl. 210—25** **12 Claims**

1. In an ion exchange process for the treatment of liquids, in a U-shaped container forming a resinous-bed ion exchanger having an inlet aperture connected to an inflow conduit and an outlet aperture connected to an outflow conduit a differential pressure regulator in said inflow conduit, a cylindrical regenerating container having frusto-conical ends being connected to said container, and an automatic control installation to effect conveyance of charges of ion exchanger resin upwardly from the bed in said U-shaped container to said regenerating container and re-entrain resin charges from the regenerating container to the first-mentioned container, comprising the steps of conducting the liquid being treated through said resinous-bed ion exchanger; withdrawing portions of exhausted ion exchanger resin in charges from said bed to said regenerating container; regenerating said withdrawn resin by conducting a regenerating medium through each of said withdrawn charge; and reentraining each of said regenerated resin charge in said bed, the improvement comprising: conducting said liquid being treated with a vertical motion component from above downwardly into an inflow end above said bed and



through said bed with a vertical motion component from below upwardly out of an outflow end above said bed; conducting said regenerating medium from below upwardly through said charge during regeneration of the latter; withdrawing said charges during treatment of said liquids in the bed from the outflow end of said bed; premeasuring and automatically limiting the volume of said charges withdrawn from said bed for regeneration in conformance with a predetermined maximum hourly flow volume through said resinous bed, and re-entraining said charges at the inflow end of said bed.

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**3,920,545**

## ION EXCHANGE OF METALS FROM AQUEOUS SOLUTIONS

**Perry A. Argabright, Larkspur; Larry M. Echelberger, and Brian L. Phillips, both of Littleton, all of Colo., assignors to Marathon Oil Company, Findlay, Ohio**

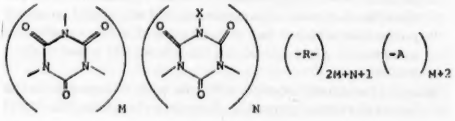
**Filed Nov. 2, 1973, Ser. No. 412,057**

**Int. Cl.² C02B** *1/48*

**U.S. Cl. 210—30** **9 Claims**

1. A method for the removal of metals by ion exchange from aqueous solutions comprising in combination the steps of:

a. contacting in a reaction media a polyisocyanurate salt having metal cation groups and also having reactive negatively charged nitrogen atoms and having the structure



with a synthetic resin having groups which are reactive with said negatively charged nitrogen atoms of said polyisocyanurate, under conditions which cause said reactive groups of the synthetic resin to react with said anionic groups to form a composition containing some polyisocyanurate salt groups attached to the synthetic resin, said synthetic resin selected from the group consisting of chloromethylated polystyrene, haloalkylated polystyrenes, polyepihalohydrins, haloalkylated polyphenyl ethers, and halogenated polypropylene in which the halo groups are chloro, bromo, or iodo, or mixtures thereof, and the alkyl groups contain from about 1–6 carbon atoms,

b. contacting said composition with an aqueous solution containing said metals to be removed,

c. permitting said metals to react with said anionic negative sites on said polymer so that said metals are removed from said aqueous solution wherein said metals are selected from the group consisting of Al, Ti, V, Cr, Mn, Fe, Co, Ni, Cu, Zn, Ga, Ge, Y, Zr, Cb, Mo, Tc, Ru, Rh, Pd, Ag, Cd, In, Sn, Sb, Ba, La, Hf, Ta, W, Re, Os, Ir, Pt, Au, Hg, Tl, Pb, Bi, Ra, Ac, Th, Pa, and U and wherein

R = a divalent radical containing about 2–40 carbon atoms,

X = an alkali metal, alkaline earth metal, or hydrogen, quaternary ammonium mono-, di-, tri-, or tetra-lower alkyl-substituted ammonium and unsubstituted ammonium, or a combination thereof,

A = a monovalent group selected from the following: isocyanate, urethane ($NHCO_2R'$), urea, amino wherein R′ is a monovalent radical containing about 1–40 carbon atoms,

M = average number of trisubstituted isocyanurate rings,

N = average number of isocyanuric acid and/or isocyanurate salt groups,

2M+N+1 = average of divalent R groups,

M+2 = average number of A groups wherein there are no N-to-N bonds and no A-to-N bonds, no A-to-A bonds and no R-to-R bonds.

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**3,920,546**

**N,N,N,N,N,N HEXAALKYL-BETA-HYDROXYTRIMETHYLENE DIAMMONIUM DIHALIDES**

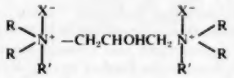
**John D. Newkirk, Downers Grove, Ill., assignor to Nalco Chemical Company, Chicago, Ill.**

**Filed Nov. 29, 1973, Ser. No. 420,153**

**Int. Cl. B01d** *21/01*

**U.S. Cl. 210—54** **3 Claims**

**1.** A method of flocculating water containing entrained inorganic solids comprising treating said water with an effective amount of a water solution of:



wherein,

R is selected from the group consisting of alkyl radicals with from 1 to 4 carbon atoms,

R′ is selected from the group consisting of alkyl radicals with from 1 to 3 carbon atoms, and

X is selected from the group consisting of chlorine, bromine and iodine.

**3,920,547**

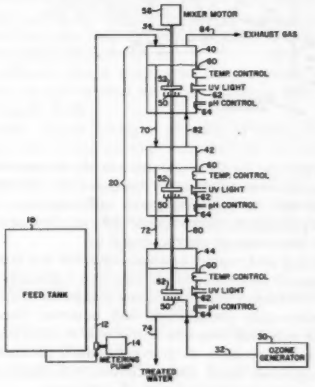
**METHOD OF DESTROYING CYANIDES**

**Richard Lee Garrison, Pearland; Herman W. Prengle, Jr., Friendswood, and Charles E. Mauk, Houston, all of Tex., assignors to Houston Research, Inc., Houston, Tex.**

**Filed May 6, 1974, Ser. No. 467,080**

**Int. Cl.² C02B** *1/18*

**U.S. Cl. 210—63** **13 Claims**




**1.** A method for the destruction of cyanides in an aqueous cyanide solution, which comprises:

contacting an aqueous solution of cyanides with an ozone-containing gas in an amount effective to react with and destroy the cyanides; and

simultaneously irradiating said aqueous cyanide solution with ultraviolet light.

**9.** A method for the destruction of cyanides complexed with iron in an aqueous solution which comprises:

providing a feedstock comprising an aqueous solution of cyanides complexed with iron and a plurality of contact zones in series;

passing said aqueous solution of cyanides complexed with iron into a first contact zone of said plurality of contact zones in series;

simultaneously passing an ozone-containing gas into the last contact zone of said plurality of contact zones in series, the amount of ozone being effective to react with and destroy said cyanides complexed with iron, whereby said aqueous solution of cyanides complexed with iron and ozone-containing gas come into mutual contact in each of said plurality of contact zones while passing countercurrently therethrough;

simultaneously irradiating at least one of said plurality of contact zones with ultraviolet light from an ultraviolet light source;

withdrawing from said first of said plurality of contact zones said ozone-containing gas, leaner in ozone; and

withdrawing from said last of said plurality of contact zones said aqueous solution with reduced cyanide content.

**3,920,548**

## WET OXIDATION PROCESS FOR WASTE MATERIAL

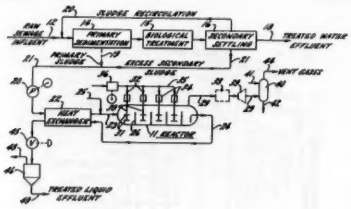
**W. Martin Fassell, Newport Beach, and Donald W. Bridges, Irvine, both of Calif., assignors to Barber-Colman Company, Rockford, Ill.**

**Filed Mar. 29, 1973, Ser. No. 346,152**

**Claims priority, application Germany, Sept. 29, 1972, 22478417**

**Int. Cl. C02c** *5/04, 3/00*

**U.S. Cl. 210—63** **6 Claims**




**1.** In a process for the wet oxidation of carbonaceous waste materials, wherein an aqueous dispersion of said materials is contacted with an oxidizing gas at sufficient time, temperature, and pressure to effect substantial oxidation of said materials, the improvement characterized by:

a. effecting said contact and said oxidation in a horizontally-elongated reactor vessel divided into a plurality of generally cylindrical interconnecting compartments,

b. continuously introducing said aqueous dispersion of waste materials near one end of said reactor vessel, flowing said dispersion from compartment to compartment through said vessel, and withdrawing oxidized dispersion from near the opposite end of said vessel,

c. maintaining the pH of said dispersion in the acid range,

d. continuously introducing said oxidizing gas into said dispersion in a plurality of said compartments, and

e. vigorously agitating the dispersion in said plurality of compartments to disperse oxidizing gas therethrough, and thereby effect oxidation of said waste materials to produce an ecologically acceptable effluent.

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**3,920,549**

## METHOD AND APPARATUS FOR MULTIPHASE FLUID COLLECTION AND SEPARATION

**Joseph F. Gigliello, and Harry A. Kragle, both of Corning, N.Y., assignors to Corning Glass Works, Corning, N.Y.**

**Filed Mar. 18, 1974, Ser. No. 452,059**

**Int. Cl.[2] B01D** *21/26*

**U.S. Cl. 210—83** **10 Claims**

**1.** An apparatus for collecting a multiphase fluid such as blood and for separating and partitioning said fluid into a lighter phase and a heavier phase comprising:

a. a container having an open end and a closed end;

b. gel-like material initially positioned adjacent said container closed end, said gel-like material being thixotropic and chemically inert to the lighter and heavier phases and having a specific gravity between the specific gravities of said heavier and lighter phases; and

c. energizer means having wall portions initially partially submerged in said gel-like material for maintaining the gel-like material in said initial position prior to centrifugation and constructed and arranged for influencing said gel-like material to flow, under the influence of centrifugal force, along wall portions of said container, and said energizer means having a specific gravity greater than the specific gravity of said gel-like material and being positioned with at least some wall portions thereof in spaced-apart relationship from wall portions of said container.

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**3,920,550**

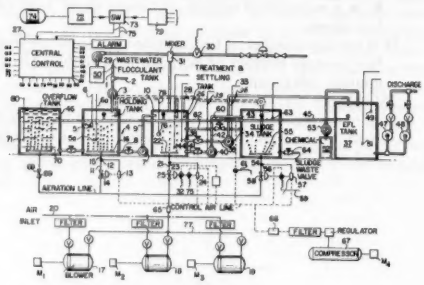
## PROCESS AND EQUIPMENT FOR AUTOMATIC CHEMICAL-BIOLOGICAL WASTEWATER TREATMENT WITH PROVISIONS FOR RECYCLE AND REUSE

**R. Paul Farrell, Jr., and James L. Setser, both of Schenectady, N.Y., assignors to Environment/One Corporation, Schenectady, N.Y.**

**Filed Sept. 21, 1972, Ser. No. 290,809The portion of the term of this patent subsequent to Oct. 29, 1991, has been disclaimed.**

**Int. Cl.[2] B01D** *35/00*

**U.S. Cl. 210—86** **7 Claims**




**1.** A wastewater treatment system to be connected between a wastewater inlet and a treated effluent outlet, comprising:

a wastewater holding tank with means for receiving wastewater directly from the inlet; a treatment and settling tank; level responsive means for transferring wastewater from said holding tank to said treatment and settling tank when the liquid in the holding tank reaches a predetermined level; means for supplying air to the wastewater within the treatment and settling tank to agitate and aerate it for aerobic treatment, and having means for providing a quiescent period to provide separation of effluent and activated sludge; an effluent storage tank with mans for receiving effluent from said treatment and settling tank and means for removing liquid from said effluent storage tank; a digester with means for receiving sludge from said treatment and settling tank; a separate overflow tank; gravity overflow means for conducting fluid to said overflow tank and having overflow inlets above a predetermined level in said treatment and settling tank, said digester and said effluent storage tank; said gravity overflow means further having an overflow inlet in said holding tank to conduct fluid above a predetermined level within said holding tank to said overflow tank; said overflow inlets in each of said treatment and settling tank, digester, and effluent storage tank being elevated above the overflow inlet of said wastewater holding tank said gravity overflow means further having an outlet in said overflow tank lower than each of said overflow inlets for conducting overflow from any of said

treatment and settling tank, effluent storage tank, wastewater holding tank and digester first to said overflow tank until the liquid level within said gravity overflow means rises to the level of said wastewater holding tank overflow inlet, thereafter the overflow from said treatment and settling tank, digester and effluent storage tank will drain into said wastewater holding tank.

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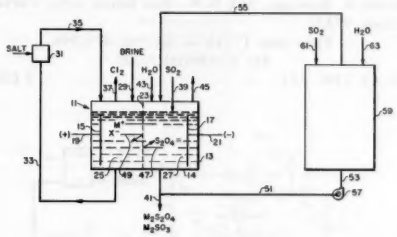
**3,920,551**

## ELECTROLYTIC METHOD FOR THE MANUFACTURE OF DITHIONITES

**Edward H. Cook, Jr., Lewiston, and Alvin T. Emery, Youngstown, both of N.Y., assignors to Hooker Chemicals & Plastics Corporation, Niagara Falls, N.Y.**

**Filed Nov. 1, 1973, Ser. No. 411,621**
**Int. Cl.[2] C25B** *1/26, 1/14, 13/08*
**U.S. Cl. 204—92** **9 Claims**




1. A method for electrolytically manufacturing a alkali metal dithionite and chlorine from sulfur dioxide and an alkali metal chloride which comprises feeding sulfur dioxide to a cathode compartment of an electrolytic cell having anode and cathode compartments, with anode and cathode therein, respectively, and a cation-active permselective membrane dividing the compartments, feeding an aqueous chloride solution into the anode compartment thereof, maintaining the pH in the cathode compartment in a range at which the alkali metal dithionite produced therein is stable and withdrawing chlorine from the anode compartment and alkali metal dithionite from the cathode compartment.

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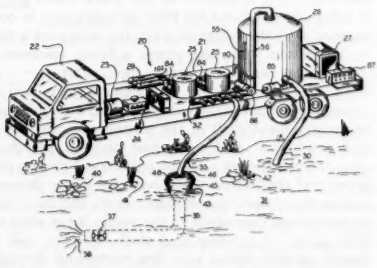
**3,920,552**

## SELF-CONTAINED WATER TREATMENT SYSTEM

**Kenneth F. Elkern, South Chicago Heights, Ill., assignor to Kenneth F. Elkern, Jr. and Pamela K. Elkern, both of South Chicago Heights, Ill.**

**Filed June 28, 1973, Ser. No. 374,325**
**Int. Cl.[2] B01F** *3/04*; **C02B** *3/08*; **C02C** *5/04*
**U.S. Cl. 210—141** **7 Claims**



1. A portable water treatment system,

said system mounted on an easily transportable vehicle,

said system including a double closed shell mixing tank having an inside shell within an outside shell,

means for drawing ambient water into the outside shell of said tank,

means for selectively introducing chemicals into said outside shell of said tank,

means for drawing the ambient water and chemicals from the outside shell to the inside shell, means for selectively introducing air into the ambient water near the entrance to said inside shell,

means for drawing fluids through the inside shell,

means in the inside shell of said tank for thoroughly mixing said water and any of said air or chemicals introduced into said tank to treat said water,

said means in the inside shell of said tank for thoroughly mixing said water and any of said air or chemicals introduced into said tank to treat said water including baffle means and deflector plates,

said deflector plates positioned for directing a mixing stream of said treated water in a tortious path through said inside shell,

said baffle means having a plurality of holes therein to agitate the water passing therethrough for mixing the water with chemicals and air, and

said baffle means being positioned relative to said deflector plates so that water directed by deflector plates passes through said plurality of holes in the baffle means.

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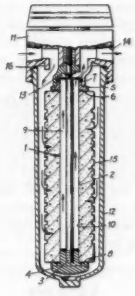
**3,920,553**

## POSITIONING DEVICE FOR FILTER CARTRIDGE ASSEMBLY

**Guido D. Cilento, Southington, Conn., assignor to AMF Incorporated, White Plains, N.Y.**

**Filed June 27, 1974, Ser. No. 483,737**
**Int. Cl.[2] B01D** *27/08*
**U.S. Cl. 210—232** **1 Claim**



1. An apparatus for positioning a filter cartridge in a vessel, including:

an elongated member longitudinally positionable within a recessed member depending from said vessel, said elongated member having a plurality of integrally formed locating surfaces disposed about its periphery for receiving and centering a filter cartridge thereon;

a first sealing member affixed to said elongated member at the upper end thereof, provided with a flange portion extending therefrom, having a sealing projection for sealing with a first end of said cartridge, fluid flow passage means internal of said first sealing member for communication with said recessed member and elastomeric sealing means disposed at the upper end of said first sealing member for sealing at the contact surfaces with said recessed member;

a second sealing member fixedly de-attachable to the lower end of said elongated member, provided with a flange portion extending therefrom, having a sealing projection for sealing with a second end of said cartridge, said respective sealing projections being adapted to seal the respective interfaces formed at the ends of said cartridge with said sealing members, as said second sealing member is affixed to said elongated member; and

abuttment means depending from said second sealing member for grasping said second sealing member.

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**3,920,554**

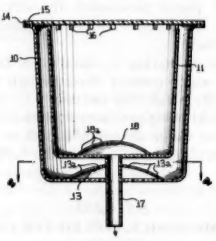
**SCAVENGER FILTER**

**Peter K. Sanders, 1100 Ingelside Ave., McLean, Va. 22101**

**Filed July 25, 1974, Ser. No. 491,757**

**Int. Cl.[2] B01D** *27/08*

**U.S. Cl. 210—247** **8 Claims**



**1.** A filter comprising an outer primary housing and a secondary housing; said housings being cup-shaped and said secondary housing resting within said primary housing; porous oleophlic filter material substantially filling said inner housings and the space between said housings; inlet means for introducing a liquid stream at the central portion of the bottom of said primary houisnig; means closely downstream from said inlet means for diffusing an incoming liquid stream from said inlet means substantially evenly throughout the available cross-section of said primary housing; means for transferring, without loss, said liquid stream from the top of said primary housing to the top of said secondary housing; said last means including apertures for spreading said stream over substantially the entire top of said secondary housing; an outlet means from said filtered stream located at the bottom of said secondary housing; diffusing means located upstream from said outlet, covering means for closing off said housings, whereby liquid is constrained to proceed through said primary and secondary housings seriatim in proceeding from said inlet means and said outlet means.

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**3,920,555**

**DEVICE FOR DIALYSIS APPARATUS WHERE A NUMBER OF ELEMENTS ARE POSITIONED IN A STACK**

**Paul-Johny Johansson, Bankgatan 14, S-223 52 Lund, Sweden**

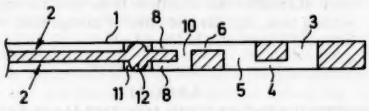
**Filed Dec. 10, 1973, Ser. No. 423,394**

**Claims priority, application Sweden, Sept. 13, 1973, 7312462**

**Int. Cl.[2] B01D** *31/00, 13/00*

**U.S. Cl. 210—321** **7 Claims**

**1.** A dialysis apparatus comprising a stacked array of alternating first and second plates having at least one diaphragm inserted between opposing faces of said plates; each of said first and second plates having a passage system and end portions; each end portion consisting of an inlet hole, a first passage branch and a first opening, a second passage branch and a second opening, at least one third passage branch and a distributing passage including a series of distributors; said first passage branch projecting into said inlet hole and into said first opening, said second passage branch projecting into said first opening and into said second opening, said third passage branch projecting into said second opening and said distributing passages, said distributing passages connecting



with said passage system, each end portion additionally having an aperture aligned with an inlet hole on an opposing alternate plate; each of said diaphragms having an aperture aligned with each inlet hole on each opposing plate.

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**3,920,556**

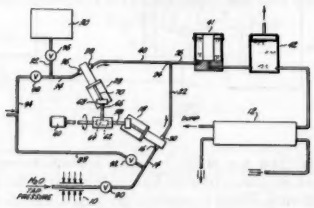
**HEMODIALYSIS SYSTEM**

**Donald B. Bowman, 561 N.W. Van Buren Ave., Corvallis, Oreg. 97330**

**Filed June 17, 1974, Ser. No. 479,998**

**Int. Cl.[2] B01D** *31/00*

**U.S. Cl. 210—321** **2 Claims**



**1.** In an apparatus for preparing a hemodialysis solution by admixing a proportional amount of a dialysate concentrate into a metered stream of flowing water, the improvement comprising:

a hemodialysis fluid conduit which leads to a hemodialyzer;

a first positive displacement pump for pumping water into said conduit;

a second substantially identical positive displacement pump for pumping a proportionate amount of dialysate concentrate into the conduit, into admixture with said water;

each said positive displacement pump comprising side and end wall means together defining a blind cylindrical pumping chamber which includes angularly spaced apart inlet and outlet ports in the side wall means, a piston extending into said pumping chamber and including a fluid passageway, and drive means for simultaneously rotating and reciprocating said piston, so that the fluid passageway is in communication with the inlet port and the outlet port is blocked by the piston when the piston is being retracted and the fluid passageway is in communication with the outlet port and the inlet port is blocked by the piston when the piston is being advanced, said drive means including a rotary input shaft;

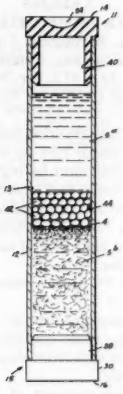
a two gear reduction means comprising a worm gear on the rotary input shaft of the first pump and a circular gear on the rotary input shaft of the second pump in mesh with siad worm gear, said worm and circular gears having a gear ratio providing a speed reduction between the first pump and the second pump resulting in the desired proportioning of the dialysate concentrate and the water; and

motor means connected to the rotary input shaft of said first pump for rotating said shaft, whereby said motor means directly drives said first pump and through said gear reduction means proportionally drives the second pump.

## 3,920,557
## SERUM/PLASMA SEPARATOR--BEADS-PLUS-ADHESIVE TYPE

**Waldemar A. Ayres, Rutherford, N.J., assignor to Becton, Dickinson and Company, East Rutherford, N.J.**

**Filed Feb. 27, 1974, Ser. No. 446,343**
**Int. Cl.² B01D** *21/26*
**U.S. Cl. 210—516** **4 Claims**



**1.** A self-contained unitary separator assembly for the separation and isolation of blood plasma or blood serum from blood cellular material which comprises:

a. a container having a first open end which is adapted to receive blood for subsequent separation into a light phase and a heavy phase and a second open end for removing said light phase;

b. closures sealing the open ends of the container, said closures being formed of a self-sealing elastomeric material which is penetrable by a cannula; and

c. a multiplicity of polystyrene beads coated with an adhesive silicone grease having a viscosity of about 30,000 centistokes and which is immiscible and insoluble in blood and non-reactive therewith, said beads having a specific gravity between about **1.03** and **1.09**, said coated beads being adhered together in a location adjacent to the closure for said second end.

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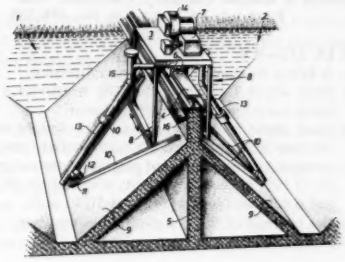
## 3,920,558
## MUD SCRAPING DEVICE

**Henric Lind, Solna, and Jörgen Pihl, Kungsangen, both of Sweden, assignors to Polypur Forsaljnings AB, Sundbyberg, Sweden**

**Filed Dec. 28, 1973, Ser. No. 429,634**
**Claims priority, application Sweden, Jan. 3, 1973, 000721**
**Int. Cl.² C02B** *1/20*
**U.S. Cl. 210—527** **3 Claims**

**1.** A combined solids scraper and aspirator for a multicompartment settling basin having at least two adjacent compartments (**1,2**) separated by a common wall (**5**) projecting above the level of said basin, which comprises track means (**4**) disposed along the top of said common wall (**5**), a carriage (**3**) traveling on said track (**4**), means (**7**) for driving said carriage, separate scraping means (**10**) in each such compartment (**1,2**) suspended from opposite sides of said carriage (**3**) in proximity to the respective compartment floors (**9**), suction duct means (**13**) carried by said carriage in association with each such scraping means (**10**) for removing the solids scraped thereby, pump means (**13**) coupled to said suction duct means for pumping said solids through said duct means, and at least one collector channel extending along said common wall for



receiving said solids from said duct means away from said compartments.

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## 3,920,559
## COMPOSITION AND PROCESS FOR DEFOAMING AQUEOUS DRILLING FLUIDS

**Katherine Anne Cline Elting, Houston, Tex., assignor to Milchem Incorporated, Houston, Tex.**

**Filed Feb. 19, 1974, Ser. No. 443,400**
**Int. Cl.² B01D** *19/04*; **C09K** *7/02*
**U.S. Cl. 252—8.5 C** **5 Claims**

**1.** A process for inhibiting foaming in an aqueous drilling fluid having a tendency to foam, said process comprising adding to said fluid a foam inhibiting amount of propylene oxide adduct of oleyl alcohol and a polyvalent metal salt of stearic acid, said salt being a member selected from the class consisting of aluminum, calcium, zinc and iron, the mole ratio of propylene oxide to alcohol being about 20-to-1.

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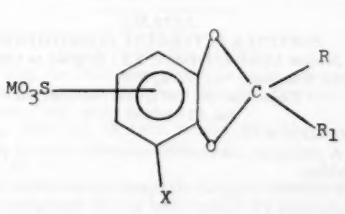
## 3,920,560
## DRILLING FLUID

**David R. McCoy, and Mahmoud S. Kablaoui, both of Wappingers Falls, N.Y., assignors to Texaco Inc., New York, N.Y.**

**Filed June 27, 1974, Ser. No. 483,599**
**Int. Cl.² C09K** *7/02*
**U.S. Cl. 252—8.5 C** **6 Claims**

**1.** An aqueous drilling fluid containing clay solids and as the disperant from about 0.1 to about 4 pounds per barrel of drilling fluid of a water soluble salt of a sulfonated, dialkyl-substituted benzodioxole compound having the general formula




wherein R and $R_1$ each is an alkyl group containing from 1 to 15 carbon atoms, M is a water soluble cation selected from the group consisting of sodium, potassium, lithium $-SO_3H$ or $-SO_3M$ wherein M is selected from the group consisting of sodium, potassium, lithium and ammonium.

3,920,561

## COMPOSITION FOR IMPARTING SOFTNESS AND SOIL RELEASE PROPERTIES TO FABRICS

Thomas Allen DesMarais, Cincinnati, Ohio, assignor to The Procter & Gamble Company, Cincinnati, Ohio

Filed July 15, 1974, Ser. No. 488,338
Int. Cl.[2] D06M *15/24*
U.S. Cl. 252—8.8 10 Claims

1. A fabric treating composition comprising:
a. from about 1 to about 50% by weight of a combined fabric softening and anti-static agent;
b. from about 0.05 to about 10% by weight of a methyl cellulose ether having a DS methyl of at least about 2.1, a weight average degree of polymerization of greater than about 100, a solution viscosity above about 20 centipoise and a gel point less than about 50°C; and
c. the balance of the composition comprising a water-dispersible carrier.

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3,920,562

## DEMULSIFIED EXTENDED LIFE FUNCTIONAL FLUID

Edward G. Foehr, San Rafael, Calif., assignor to Chevron Research Company, San Francisco, Calif.

Filed Feb. 5, 1973, Ser. No. 329,476
*Disclosure was also published under Trial Voluntary Protest Program on Jan. 28, 1975.*
Int. Cl.[2] C10M *1/48*
U.S. Cl. 252—32.7 E 7 Claims

1. A lubricating oil composition which comprises:
A. a major amount of an oil of lubricating viscosity,
B. a dispersant amount of an alkenyl succinimide of a polyalkylene polyamine,
C. an antioxidant amount of a Group II metal salt of a dihydrocarbyl dithiophosphoric acid,
D. a friction modifying amount of a hydroxy fatty acid ester of a dihydric or polyhydric alcohol or an oil-soluble oxalkylated hydroxy fatty acid ester of a dihydric or polyhydric alcohol, and
E. a detergent amount of a Group II metal salt of a hydrocarbylsulfonic acid.

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3,920,563

## SOAP-CATIONIC COMBINATIONS AS RINSE CYCLE SOFTENERS

Harold Eugene Wixon, New Brunswick, N.J., assignor to Colgate-Palmolive Company, New York, N.Y.

Filed Oct. 31, 1972, Ser. No. 302,561
Int. Cl.[2] D06M *13/46*
U.S. Cl. 252—8.75 7 Claims

1. A fabric-softening composition having improved softening and whitening properties comprising a cationic quaternary ammonium softener and soap in the weight ratio of 1:1 to 2:1 of soap to cationic.

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3,920,564

## SOFTENER-DETERGENT COMPOSITION

John Jerome Grecsek, Trenton, N.J., assignor to Colgate-Palmolive Company, New York, N.Y.

Filed Sept. 20, 1972, Ser. No. 290,720
Int. Cl.[2] D06M *13/46*
U.S. Cl. 252—8.75 12 Claims

1. A detergent composition essentially free of phosphate comprising:
a. a synthetic organic detergent selected from the group consisting of nonionic and anionic detergents and mixtures thereof;
b. as the sole fabric softener, a compound selected from the group consisting of quaternary ammonium fabric softeners and N-higher alkyl alkylene diamines wherein the higher alkyl group contains from about 8 to about 20 carbon atoms and the alkylene group contains from about 2 to about 6 carbon atoms; and
c. a builder salt selected from the group consisting of water-soluble salts of aminocarboxylic acids, sodium citrate, and mixtures thereof.

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3,920,565

## FABRIC SOFTENER COMPOSITION AND METHOD

David Russell Morton, Burlington, Canada, assignor to The Procter & Gamble Company, Cincinnati, Ohio

Filed Feb. 23, 1973, Ser. No. 335,194
Int. Cl.[2] D06M *13/46*
U.S. Cl. 252—8.75 9 Claims

1. A liquid softener composition consisting essentially of
A. from about 2 to about 15% by weight of a cationactive fabric softener compound having two straight-chain organic groups of from 8 to 22 carbon atoms;
B. from about 0.5 to about 4% of an alkali metal salt of a fatty acid of from 16 to 22 carbon atoms or a mixture of fatty acid soaps, at least 50% of said mixture having 16 or more carbon atoms;
c. from 0 to about 2% of an emulsifier selected from the group consisting of
1. the condensation product of 1 mole of alkylphenol wherein the alkyl chain contains from about 8 to about 18 carbon atoms with from about 1 to about 100 moles of ethylene oxide,
2. the condensation product of 1 mole of an aliphatic alcohol wherein the alkyl chain contains from about 10 to about 24 carbon atoms with from about 1 to about 100 moles of ethylene oxide,
3. polyethylene glycol having a molecular weight of from about 1400 to about 30,000,
4. mixtures thereof; and
D. the balance water.

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3,920,566

## SELF-NEUTRALIZING WELL ACIDIZING

Edwin A. Richardson, Houston, and Ronald F. Scheuerman, Bellaire, both of Tex., assignors to Shell Oil Company, Houston, Tex.

Continuation-in-part of Ser. No. 274,778, July 24, 1972, Pat. No. 3,826,312. This application June 20, 1973, Ser. No. 371,797
Int. Cl.[2] E21B *43/27*
U.S. Cl. 252—8.55 C 2 Claims

1. A self-neutralizing and buffering acid for being flowed into contact with material in a relatively remote location and subsequently becoming a substantially neutral solution, consisting essentially of:
an aqueous solution containing from about 7.5 to 15 percent hydrochloric acid, from about 0 to 2 percent hydrofluoric acid, and a mixture of urea and at least one amide of the group consisting of formamide, dimethylformamide and acetamide; and
a correlation between the composition and concentration of the components of the aqueous solution relative to the temperature and travel time of a solution flowed into the relatively remote location such that the self-neutralization is delayed until the acid has reached said location and such that the pH of the aqueous solution is subsequently increased to from about 4 to 6, even though none of the acid is neutralized by the material contacted in said location.

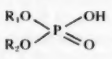
3,920,567

## NOVEL OXAZOLINE-ALKYL ACID PHOSPHATE ADDUCTS USEFUL AS ASHLESS ANTIWEAR ADDITIVES

Alfred H. Miller, Somerset, N.J., assignor to Exxon Research & Engineering Co., Linden, N.J.

Filed Dec. 27, 1974, Ser. No. 536,822
Int. Cl.[2] C10M *1/44, 3/38, 5/24, 7/24*
U.S. Cl. 252—32.5 11 Claims

1. A composition comprising a lubricating oil and a quaternary salt formed by reacting (a) an alkyl acid phosphate characterized by the general formula:



wherein $R_1$ and $R_2$ are independently selected from the group consisting of hydrogen and alkyl radicals having 2 to 6 carbon atoms, provided that $R_1$ and $R_2$ simultaneously are not hydrogen, with (b) a hydroxyalkyl substituted oxazoline having an alkyl or alkene radical of 8 to 22 carbon atoms attached to the ring carbon atom between the nitrogen and oxygen atoms of the oxazoline ring and at least one hydroxyalkyl group having 1 to 4 carbon atoms attached to one of the other two ring carbon atoms.

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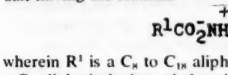
3,920,568

## SYNTHETIC ESTER LUBRICANT COMPOSITIONS WITH IMPROVED RYDER GEAR LOAD-CARRYING ABILITY

Harold Shaub, New Providence, and Adolph J. Garbus, Roselle, both of N.J., assignors to Exxon Research & Engineering Co., Linden, N.J.

Filed Apr. 26, 1972, Ser. No. 247,742
Int. Cl. C10m *3/18, 3/26*
U.S. Cl. 252—34.7 4 Claims

1. A lubricant composition of improved load-carrying ability comprised of a major portion of synthetic ester oil having an inherent Ryder gear load-carrying ability of less than 2200 pounds per inch and a minor amount, in the range of 0.1 to 5.0 wt. %, of an ammonium salt of an organic carboxylic acid, said salt having the formula



wherein $R^1$ is a $C_8$ to $C_{18}$ aliphatic hydrocarbyl moiety, $R^2$ is a $C_4$ aliphatic hydrocarbyl moiety, and $R^3$ and $R^4$ are each a hydrogen atom.

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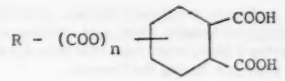
3,920,569

## DETERGENT COMPOSITION HAVING SUBSTITUTED PHTHALIC ACID SALT BUILDER

Phillip Alfred Carson, Wirral, and Peter Tissington, Laceby, both of England, assignors to Lever Bros. Co., New York, N.Y.

Filed Feb. 9, 1973, Ser. No. 330,894
Claims priority, application United Kingdom, Feb. 14, 1972, 6682/72
Int. Cl.[2] C11D *3/20*
U.S. Cl. 252—89 3 Claims

1. A detergent composition comprising an anionic, nonionic, amphoteric or zwitterionic detergent active compound and as a detergency builder a water soluble or dispersible salt of a substituted phthalic acid having the formula:



wherein R is a $C_{10}$–$C_{20}$ alkyl or alkenyl group and $n$ is 0 or 1, the ratio of the detergent active compound to the detergency builder being from about 10:1 to 1:10.

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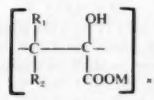
3,920,570

## SEQUESTRATION OF METAL IONS BY THE USE OF POLY-ALPHA-HYDROXYACRYLATES

Julien Mulders, Brussels, Belgium, assignor to Solvay & Cie., Brussels, Belgium

Division of Ser. No. 207,965, Dec. 14, 1971, Pat. No. 3,839,215. This application June 27, 1974, Ser. No. 483,541
Claims priority, application Luxemburg, Dec. 17, 1970, 62270
Int. Cl.[2] C11D *3/00*
U.S. Cl. 252—89 10 Claims

1. A detergent composition comprising at least a surface active agent and at least, as builder, a polyelectrolyte with sequestering action toward metal ions, said polyelectrolyte having the formula



where $R_1$ and $R_2$ are selected from the group consisting of hydrogen and alkyl of between 1 and 3 carbon atoms, M is selected from the group consisting of alkali metal and ammonium, and $n$ is a positive integer between 3 and a higher value such that substantial solubility of said polyelectrolyte in aqueous solution is maintained when said detergent composition is added to water.

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3,920,571

## GREASE COMPOSITION AND METHOD OF PREPARING THE SAME

Richard E. Crocker, Novato, Calif., assignor to Chevron Research Company, San Francisco, Calif.

Filed Sept. 16, 1974, Ser. No. 506,062
Int. Cl.[2] C10M *1/10, 3/02, 5/02, 7/02*
U.S. Cl. 252—25 17 Claims

1. A grease composition comprising a major part of a lubricating oil containing: (1) from 0.5 to 10 weight percent of a thickener selected from mono- or polyurea compounds or a mixture of mono— or polyurea compounds having an average from 1 to 8 ureido groups and having a number average molecular weight between about 375 and 2,500; and (2) from 3 to 30 weight percent of an alkaline earth metal carbonate.

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3,920,572

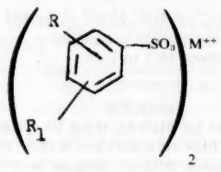
## HEAT TRANSFER FLUIDS

John M. King, San Rafael, and Robert L. Peeler, Albany, both of Calif., assignors to Chevron Research Company, San Francisco, Calif.

Filed Apr. 18, 1973, Ser. No. 352,152
Int. Cl.[2] C09K *5/00*
U.S. Cl. 252—75 9 Claims

1. In a method of exchanging heat wherein an organic hydrocarbon heat transfer fluid boiling within the range of about 600° and 900°F. is passed through one side of a heat exchanger and a process stream is passed through the other side to effect an exchange of heat between said heat transfer fluid and said process stream, an improvement for reducing the boiling properties of said heat transfer fluid comprising incorporating from 0.5 to 3 wt. percent of an oilsoluble alkaline

earth metal carbonate overbased alkaline earth metal sulfonate into said heat transfer fluid, said alkaline earth metal sulfonate having a metal based ratio of at least 4, said alkaline earth metal sulfonate having the formula:



wherein

M is an alkaline earth metal

R is hydrogen or a $C_{10}$–$C_{22}$ alkyl, and

$R_1$ is an alkyl having from 3 to 10 carbons when R is an alkyl or an alkyl having 8 to 22 carbons when R is hydrogen.

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**3,920,573**

**PREPARATION OF MIXTURES OF BISPHENOL A AND F**

**Geert C. Vegter, and Johan van Gogh, both of Amsterdam, Netherlands, assignors to Shell Oil Company, Houston, Tex.**

**Filed Sept. 28, 1973, Ser. No. 401,909**

**Claims priority, application United Kingdom, Apr. 26, 1973, 19909/73**

**Int. Cl.[2] C07C *39/16***

**U.S. Cl. 252—182** **6 Claims**

1. The process for preparing a mixture of diphenylolalkanes consisting essentially of contacting a phenolic compound or compounds with a mixture of acetone and formaldehyde or a precursor of formaldehyde in the presence of an acid catalyst and optionally a beta-mercaptopropanoic or thiol co-catalyst, where;

I. The molar ratio of acetone to formaldehyde is from about 20:1 to about 0.5:1,

II. The molar ratio of phenolic compound or compounds to the sum of the acetone and formaldehyde is from about 10:1 to about 25:1,

III. The reaction temperature is from about 20°C to about 110°C,

IV. The reaction time is from about 0.25 hr. to about 5 hr., and recovering the resulting mixture of diphenylolpropane and diphenylolmethane having less than 10 percent by weight of by-products in which a molecule contains more than 2 phenolic groups.

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**3,920,574**

**SOLIDIFICATION RETARDATION OF LIQUID CRYSTALLINE COMPOSITIONS WITH STEROID DERIVATIVES OF ISOSTEARYL CARBONATE**

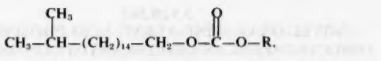
**George T. Brown, Jr., Dayton; Donald B. Clark, Kettering, and Donald E. Koopman, Miami Township, all of Ohio, assignors to Djinnii Industries, Inc., Dayton, Ohio**

**Filed Aug. 26, 1974, Ser. No. 500,671**

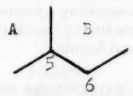
**Int. Cl.[2] C09K *3/34*; C07C *97/24*; C09B *1/50***

**U.S. Cl. 252—299** **7 Claims**

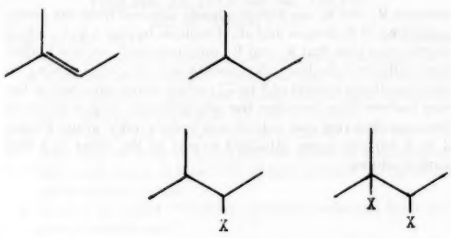
1. A cholesteric liquid crystalline composition containing about 10–80 weight per cent of a compound for use in retarding crystallization the cholesteric of liquid crystalline material, said compound having the formula



wherein R is a derivative of a steroid group selected from the group consisting of cholesterol, stigmasterol and sitosterol; and where the chemical bond linkage of carbon 5 to carbon 6



of said steroid group is selected from a group consisting of



X being a halogen.

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**3,920,575**

**GAS GENERATING COMPOSITION AND METHOD OF PREPARING COMPRESSION MOLDED ARTICLES THEREFROM**

**Takehiko Shiki, Nobeoka; Ikuo Harada, Higashikurume; Tadamasa Harada, Ooita, and Masaaki Shiga, Tokyo, all of Japan, assignors to Asahi Kasei Kogyo Kabushiki Kaisha, Tokyo, Japan**

**Filed Feb. 21, 1974, Ser. No. 444,607**

**Claims priority, application Japan, Mar. 3, 1973, 48-25524; Mar. 3, 1973, 48-25525; Mar. 3, 1973, 48-25526**

**Int. Cl.[2] C06B *35/00*, *21/00*; C06D *5/06***

**U.S. Cl. 252—188.3** **9 Claims**

1. A gas generating composition comprising:

I. at least one metal azide compound selected from the group consisting of alkali metal azides, alkaline earth metal azides and hydroxy metal azides having the general formula

$M(OH)_m(N_3)_n$

wherein

M represents magnesium, calcium, strontium, zinc, boron, aluminum, silicon, tin, titanium, zirconium, magnesium, chromium, cobalt or nickel;

$(m + n)$ represents an atomic valency of M; and $m$ and $n$ represent a positive number, respectively,

II. at least one oxidizing agent or a combustion composition comprising at least one oxidizing agent and at least one reducing agent; and

III. at least one compound selected from the group consisting of a compound of the formula

$(Al_2O_3)_p(M_xO)_q(SiO_2)_r.sH_2O$

wherein

M represents lithium, sodium, potassium, strontium, magnesium or calcium; $x$ is 1 or 2; $p$ and $q$ represent zero or a positive number, respectively but $p$ and $q$ are not zero simultaneously; $r$ is a positive number; and $s$ is zero or a positive number,

potassium chloride, potassium bromide, calcium chloride, sodium bromide, strontium chloride and strontium hydroxide, in an amount of from about 0.5 to 30 parts by weight based on 100 parts by weight of the total of the metal azide compound (I) and the oxidizing agent or the combustion composition (II).

## 3,920,576
## DOPING OF NEMATIC LIQUID CRYSTAL

**Freeman B. Jones, Jr., Westlake Village; Roger Chang, and Edward P. Parry, both of Thousand Oaks, all of Calif., assignors to Rockwell International Corporation, El Segundo, Calif.**

**Filed May 7, 1973, Ser. No. 357,566**
**Int. Cl.[2] C09K** *3/34, 3/00;* **G01N** *31/00, 33/00*
**U.S. Cl. 252—299** **6 Claims**

**5.** A nematic liquid crystal mixture comprising
a pure Schiff-base nematic liquid crystal, and
a dopant comprising p-toluenesulfonic acid and a bifunctional material selected from the group consisting of m-aminophenol, p-aminophenol, 3-dimethylaminophenol, 4-amino-m-cresol, 4-hydroxypyridine, and p-aminobenzoic acid, said bifunctional dopant being present in a quantity in the range of 0.1 to 5.0 weight % of the liquid crystal and said p-toluenesulfonic acid being present in a concentration of less than 300 ppm by weight of the liquid crystal.

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## 3,920,577
## IODINE RETENTION DURING EVAPORATIVE VOLUME REDUCTION

**Herschel W. Godbee, Oak Ridge; George I. Cathers, Knoxville, and Raymond E. Blanco, Oak Ridge, all of Tenn., assignors to The United States of America as represented by the United States Energy Research and Development Administration, Washington, D.C.**

**Filed July 16, 1974, Ser. No. 489,791**
**Int. Cl.[2] C09K** *11/04*
**U.S. Cl. 252—301.1 W** **4 Claims**

**1.** A method for retaining radioactive iodine within an aqueous waste solution during evaporative volume reduction, comprising the steps of:
isotopically diluting said waste solution with nonradioactive iodine wherein the amount of nonradioactive iodine diluent added to said solution is at least $10^3$times the amount of radioactive iodine present in said solution;
adjusting the pH of said solution to at least pH 9;
adding an effective amount of a reducing agent to reduce iodine species in 0 to +7 oxidation states to the iodide state; and
evaporating the aqueous phase of said solution while substantially retaining radioactive iodine within said solution.

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## 3,920,578
## COLLOIDAL SILICA-BASED BINDER VEHICLES AND GELS

**Paul Clifford Yates, Wilmington, Del., assignor to E. I. Du Pont de Nemours & Company, Wilmington, Del.**

**Continuation-in-part of Ser. No. 736,247, June 12, 1968, abandoned. This application Feb. 26, 1971, Ser. No. 119,414**
**Int. Cl.[2] B01J** *13/00*
**U.S. Cl. 252—313 S** **20 Claims**

**1.** A composition of matter consisting essentially of
a. from 0% to 95% by weight of a particulate or fibrous filler material and
b. from 5% to 100% by weight of an aqueous binder vehicle consisting essentially of from 20% to 75% by weight of colloidal amorphous silica having a median particle diameter of from 5 to 500 mμ; from X to Y moles of dissolved alkaline ionic silicate per 1000 grams of said vehicle exclusive of said silica where X and Y are as follows:

$$X=10\ 1.90-\frac{\phi}{2}\ 1.762+\frac{35.2}{D}-\frac{pH}{2}+\frac{\exp.(pH-10.27)}{S}$$

$$Y=10\ 3.70-\frac{\phi}{2}\ 1.762+\frac{35.2}{D}-\frac{pH}{2}+\frac{\exp.(pH-9.40)}{S}$$

wherein $\phi$ is the volume fraction of silica in said vehicle, D is said median particle diameter and S is the number of moles of dissolved cations other than hydrogen per 1000 grams of said vehicle exclusive of silica, with the proviso that X is not less than 0.083 and Y is not greater than 1.67; and an amount of an acid sufficient to adjust the pH of said vehicle to from 5.0 to 9.5.

**9.** A silica gel consisting essentially of from 0% to 95% by weight of a particulate or fibrous filler material and at least 5% by weight of amorphous colloidal silica particles having a median particle diameter of from 5 to 500 mμ, said colloidal silica particles being rigidly interconnected in a porous three-dimensional network by from 0.5 to 10% by weight of a polymerized alkaline ionic silicate.

**13.** A process for producing a shaped structure comprising the steps of:
1. forming a composition consisting essentially of
a. from 0% to 95% by weight of a particulate or fibrous filler material and
b. from 5% to 100% by weight of an aqueous binder vehicle consisting essentially of from 20% to 75% by weight of colloidal amorphous silica having a median particle diameter of from 5 to 500 mμ; from X to Y moles of dissolved alkaline ionic silicate per 1000 grams of said vehicle exclusive of said silica where X and Y are as follows:

$$X=10\ 1.90-\frac{\phi}{2}\ 1.762+\frac{35.2}{D}-\frac{pH}{2}+\frac{\exp.(pH-10.27)}{S}$$

$$Y=10\ 3.70-\frac{\phi}{2}\ 1.762+\frac{35.2}{D}-\frac{pH}{2}+\frac{\exp.(pH-9.40)}{S}$$

wherein $\phi$ is the volume fraction of silica in said vehicle, D is said median particle diameter and S is the number of moles of dissolved cations other than hydrogen per 1000 grams of said vehicle exclusive of silica, with the proviso that X is not less than 0.083 and Y is not greater than 1.67; and an amount of acid sufficient to adjust the pH of said vehicle to from 5.0 to 9.5, and
2. maintaining said composition in the shape desired for said structure for a time sufficient for gelation to occur, said time being from 5 to 300 seconds.

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## 3,920,579
## SYNTHESIS GAS PRODUCTION BY PARTIAL OXIDATION

**William L. Slater, La Habra, Calif., assignor to Texaco Inc., New York, N.Y.**

**Filed Apr. 24, 1974, Ser. No. 463,710**
**Int. Cl.[2] C01B** *2/14*
**U.S. Cl. 252—373** **11 Claims**

**1.** In a continuous process for the production of gaseous mixtures comprising $H_2$, CO, $CO_2$, $H_2O$, and optionally containing gases from the group $H_2S$, COS, $CH_4$, Ar, $N_2$ and mixtures thereof and containing particulate carbon by the partial oxidation of a hydrocarbonaceous or oxygenated hydrocarbonaceous fuel containing less than about 300 parts per million (basis weight of said hydrocarbonaceous or oxygenated hydrocarbonaceous fuel) of alkali metal ions selected from the group Na, K, Li, or mixtures thereof with a free-oxygen containing gas in an amount providing an atomic ratio of oxygen to carbon in the hydrocarbonaceous or oxygenated hydrocarbonaceous fuel in the range of about 0.80 to 1.1 in the presence of a temperature moderator, said partial oxida-

tion reaction taking place in the free-flow unpacked reaction zone of a gas generator at an autogenous temperature in the range of about 1500 °to 3500 °F and a pressure in the range of 1 to 200 atmospheres, the improvement comprising introducing into said reaction zone along with said reactants a supplemental amount of alkali metal compound selected from the group of compounds consisting of carbonates, bicarbonates, hydroxides, silicates, sulfates, sulfites, aluminates, stearates, oleates, naphthenates, acetates, borates, and hydrates of said compounds, wherein said alkali metal portion is selected from the group consisting of Na, K, Li, and mixtures thereof to raise the level of said alkali metal in the reaction zone to above 350 parts per million (basis weight of hydrocarbonaceous or oxygenated hydrocarbonaceous fuel).

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3,920,580

## LIQUID CONTROL SOLUTION

**Raymond L. Mast, Elkhart, Ind., assignor to Miles Laboratories, Inc., Elkhart, Ind.**

**Filed July 12, 1973, Ser. No. 378,687**
**Int. Cl.[2] C09K *3/00*; G01N *31/00***
**U.S. Cl. 252—408** **7 Claims**

1. A stable liquid control solution including a predetermined amount of glucose for use in determining the validity of a dry reagent strip capable of indicating amounts of glucose in blood or blood serum which solution emulates whole blood or blood serum used with said strip, the solution comprising water, glucose, a preservative, and between about 3 and 35 percent by weight of an antidiffusing agent selected from the group consisting of polyvinylpyrrolidone, polyvinyl alcohol, polyethylene glycol, dextran and bovine serum albumin.

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3,920,581

## METHOD OF PREPARING A HYDRODESULFURIZATION CATALYST

**Lee Hilfman, Mount Prospect, and Edward Michalko, Chicago, both of Ill., assignors to Universal Oil Products Company, Des Plaines, Ill.**

**Filed May 18, 1973, Ser. No. 361,685**
**Int. Cl. B01j *11/22***
**U.S. Cl. 252—448** **8 Claims**

1. A method of preparing a catalytic composite of from about 5 to about 20 wt.% Group VIB metal in oxide form and from about 0.1 to about 10 wt. % Group VIII metal in oxide form composited with an alumina carrier material, comprising:

a. commingling aluminum sulfate and ammonium hydroxide in aqueous solution at a pH of from about 5.5 to about 6.5 precipitating a basic aluminum sulfate;

b. dissolving said basic aluminum sulfate and a soluble Group VIII metal compound thermally decomposable to metal oxide in an aluminum chloride hydrosol having an aluminum/chloride weight ratio of from about 0.9:1 to about 1.4:1;

c. admixing molybdenum trioxide or a soluble Group VIB metal compound thermally decomposable to metal oxide with an aqueous solution of urea and hexamethylenetetramine, and dissolving the mixture in the hydrosol;

d. dispersing the hydrosol as droplets in a hot oil bath effecting gelation of the hydrosol;

e. aging the resulting hydrogel spheres at a temperature effecting decomposition of the residual urea and hexamethylenetetramine contained therein, and washing, drying and calcining the aged spheres.

3,920,582

## SOLID CATALYST FOR HETEROGENEOUS REACTIONS

**Peter Rona, Haifa, Israel, assignor to IMI (TAMI) Institute for Research & Developement, Haifa, Israel**

**Filed Jan. 4, 1974, Ser. No. 430,804**
**Claims priority, application Israel, Jan. 17, 1973, 41330**
**Int. Cl.[2] B01J *31/02*, *31/26***
**U.S. Cl. 252—430** **11 Claims**

1. A solid catalyst for heterogeneous catalytical chemical reactions being a composite consisting essentially of a solid carrier and at least one hydrocarbyl sulfonic acid with at least two sulfonic groups per molecule.

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3,920,583

## SUPPORTS FOR CATALYST MATERIALS

**Stanley Frederick Pugh, Abingdon, England, assignor to United Kingdom Atomic Energy Authority, London, England**

**Filed May 13, 1974, Ser. No. 469,554**
**Claims priority, application United Kingdom, May 11, 1973, 22707/73**
**Int. Cl.[2] B01J *21/04*, *23/64***
**U.S. Cl. 252—465** **6 Claims**

1. A catalyst system comprising an aluminum bearing ferritic steel substrate, an electrically insulating ceramic layer on a surface of said ferritic steel substrate, and a catalytic material supported upon the ceramic layer, said aluminum bearing steel substrate comprising an alloy of iron, chromium, aluminum, and yttrium, and having the property of forming an alumina layer on heating in air, said alumina layer protecting the steel substrate against further oxidation attack, and said ceramic layer comprising a layer of alumina formed by heating the aluminum bearing ferritic steel substrate in the presence of oxygen to cause the formation of a layer of alumina on the surface of the ferritic steel substrate from aluminum within the ferritic steel substrate, thereby forming a tenaciously adherent ceramic layer on said ferritic steel substrate.

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3,920,584

## HIGH DIELECTRIC CONSTANT SCREENED CAPACITOR SYSTEM

**William A. Vitriol, Brea, Calif., assignor to Beckman Instruments, Inc., Fullerton, Calif.**

**Filed Aug. 6, 1973, Ser. No. 385,873**
**Int. Cl.[2] H01B *1/02***
**U.S. Cl. 252—514** **7 Claims**

1. An electrode material comprising a mixture of 70–90% by weight noble metals and 10–30% by weight $BaO:B_2O_3$ with a $BaO:B_2O_3$ ratio between 85% BaO:15% $B_2O_3$, by weight, and 89% BaO:11% $B_2O_3$, by weight.

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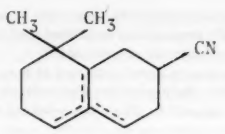
3,920,585

## PERFUME COMPOSITION INCLUDING ISOMERIC MIXTURE OF BICYCLIC NITRILES

**Erich Klein, Holzminden, Germany, assignor to Dragoco Spezialfabrik konz, Riech-und Aromastoffe Gerberding & Co. GmbH, Germany**

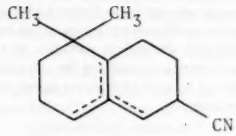
**Division of Ser. No. 269,027, July 5, 1972, Pat. No. 3,870,742.**
**This application Sept. 5, 1973, Ser. No. 394,531**
**Claims priority, application Germany, Mar. 6, 1972, 2210762**
**Int. Cl.[2] A61K *7/46*; C11B *9/00***
**U.S. Cl. 252—522** **2 Claims**

1. A perfume composition comprising a perfume mixture including a scent-imparting amount of a mixture of isomers of bicyclic nitriles of the formulae:



Ia

and



Ib

the single double bond present in I*a* and I*b* being located in any of the three positions indicated by the dotted line, said mixture of isomers being prepared by the cyclization of the isomers obtained by the reaction of equivalent amounts of myrcene and acrylonitrile.

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**3,920,586**

## DETERGENT COMPOSITIONS

**Leo R. Bonaparte, Forest Park; J. Barry Golliday, Cincinnati, and H. James Zeller, Greenhills, all of Ohio, assignors to The Procter & Gamble Company, Cincinnati, Ohio**

**Continuation-in-part of Ser. No. 298,143, Oct. 16, 1972, abandoned. This application Nov. 13, 1972, Ser. No. 305,742**

**Int. Cl.[2] C11D** *3/08*

**U.S. Cl. 252—531** **15 Claims**

1. A granular detergent composition consisting essentially of:

A. from about 20% to 70% by weight of the composition of spray-dried granules comprising from about 5% to about 40% by weight of said spray-dried granules of an anionic surfactant; and

B. from about 30% to 80% by weight of the composition of nonionic surfactant-containing carrier granules comprising:

i. a water-soluble, porous amorphous sodium silicate carrier material having a weight ratio of $Na_2O$ to $SiO_2$ of from about 1:1 to 1:3.2 and a moisture content of from about 2% to about 12% by weight of the sodium silicate; and

ii. a nonionic surfactant derived by the condensation of alkylene oxide with an organic hydrophilic compound and having a hydrophilic-lipophilic balance between 8 and 15, said nonionic surfactant being absorbed within the pores of said sodium silicate carrier material in an amount sufficient to provide a weight ratio of nonionic surfactant to silicate carrier material of from about 0.4:1 to 1.2:1;

said spray-dried granules and said nonionic surfactant-containing carrier granules being present in said detergent composition in amounts sufficient to provide an anionic surfactant concentration within said composition of from about 3% by weight to about 15% by weight; a nonionic surfactant concentration within said composition of from about 17% to about 23% by weight and a nonionic surfactant to anionic surfactant weight ratio of from about 8:1 to about 1.13:1; the ratio of the average particle sizes of said spray-dried granules and said anionic surfactant-containing carrier granules varying between 0.5:1 to 2.0:1.

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**3,920,587**

## OPEN-CELL RIGID POLYETHER POLYURETHANE FOAM

**John Watkinson, Shrub Oak, N.Y., assignor to Union Carbide Corporation, New York, N.Y.**

**Continuation-in-part of Ser. No. 279,881, Aug. 11, 1972, Pat. No. 3,793,237. This application Nov. 21, 1973, Ser. No. 417,826**

**Int. Cl.[2] C08G** *18/14, 18/48;* **C08K** *5/54*

**U.S. Cl. 260—2.5 AH** **14 Claims**

1. A process for producing an open-cell rigid polyether polyurethane foam having a closed cell content of less than 50 per cent which comprises foaming and curing a reaction mixture comprising:

a. a polyether polyol having an average molecular weight of about 200 to about 1500 and a hydroxyl number of about 200 to about 1000;

b. an organic polyisocyanate, said polyether and polyisocyanate, taken together, being present in the mixture in a major amount and in the relative amount required to produce the polyurethane;

c. a blowing agent in a minor amount sufficient to foam the reaction mixture;

d. a catalytic amount of a catalyst for the production of the polyurethane from the polyether and the polyisocyanate; and

e. as the cell-opening agent a minor amount of an essentially linear non-hydrolyzable siloxane-oxyalkylene $(AB)_n$ block copolymer having the average formula:

$$([Y(R_2SiO)_nR_2SiYO][(C_aH_{2a}O)_a])_d$$

wherein R represents a monovalent hydrocarbon radical containing from 1 to 20 carbon atoms and free from aliphatic unsaturation; $n$ is an integer of from 2 to 4 inclusive; $a$ is an integer of at least 6; $y$ is an integer of at least 4; $d$ is an integer of at least 4; Y represents a divalent organic group selected from the class consisting of —R′—, R′—CO—, —R′—NHCO—, —R′—NHCONH—R″—NHCO—, and —R′—OOCNH—R″—NHCO—, wherein R′ represents a divalent alkylene radical and R″ represents a divalent alkylene groupr or a divalent arylene group, said divalent organic group being attached to the adjacent silicon atom by a carbon to silicon bond and to the polyoxyalkylene block by an oxygen atom, the average molecular weight of each siloxane block ranges from about 500 to about 10,000; the average molecular weight of each polyoxyalkylene block ranges from about 300 to about 10,000; the siloxane blocks constitute about 20 to about 50 weight per cent of the copolymer; the polyoxyalkylene blocks constitute about 80 to about 50 weight per cent of the copolymer; and the block copolymer has an average molecular weight of at least about 30,000; said amount of cell-opening agent being sufficient to provide the polyurethane foam with a closed-cell content of less than 50 percent.

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**3,920,588**

## MICROPOROUS SHEET STRUCTURES

**Harro Träubel, and Klaus Konig, both of Leverkusen, Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany**

**Continuation of Ser. No. 161,321, July 9, 1971, abandoned. This application Dec. 11, 1972, Ser. No. 314,049**

**Claims priority, application Germany, July 11, 1970, 2034538**

*Disclosure was also published under Trial Voluntary Protest Program on Jan. 28, 1975.*

**Int. Cl.[2] C08J** *9/06*

**U.S. Cl. 260—2.5 AY** **2 Claims**

1. In a process for the production of microporous sheet structures by a process which comprises reacting an organic polyisocyanate with at least one organic compound containing at least two hydroxyl or amino hydrogen atoms reactive with NCO groups as starting materials to produce a polyaddition

product which in the homogeneous state exhibits a shore A hardness greater than 40 and a softening range above about 100° C., said reaction being effected in an organic liquid which boils below 250° C., dissolves the starting materials but is a nonsolvent for the polyaddition product to be formed and has no significant swelling effect upon the polyaddition product, by applying the solution to a substrate and removing the organic liquid, the improvement which comprises, effecting said reaction in a mixture of said organic liquid and 1 to 300 percent by weight based on the weight of said polyaddition product to be formed of a solvent selected from the group consisting of N,N-dimethylformamide, N,N-diethyl formamide, N,N-dimethyl-acetamide, N-methylmorpholine, formyl morpholine, N-acetyl morpholine, N-acetyl pyrrolidine, butyrolactone, N,N'-diacetyl piperazine diethyl sulphone, N,N'-diformyl piperazine, dimethylnitroamine (N,N) dimethyl sulphone, dipropyl sulphone, ethylene carbonate, methyl benzoate, propiolactone, N-methyl pyrrolidone, hexamethylphosphoramide, tetramethyl urea, dimethyl sulphoxide, dimethyl cyanamide and camphor, said solvent having an evaporation number at least 1.5 times that of the aforesaid organic nonsolvent.

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### 3,920,589
### LOW-DENSITY POLYESTER RESIN FOAMS AND METHOD OF PREPARATION

**Richard L. Jacobs, Yorba Linda; Donald A. Backley, Garden Grove; James V. Simpson, Anaheim, all of Calif., and Walter Beck, Bedford, Mass., assignors to Stepan Chemical Company, Northfield, Ill.**

**Filed July 18, 1974, Ser. No. 489,820**
**Int. Cl.[2] C08J 9/00; C08L 67/06**
**U.S. Cl. 260—2.5 N** **26 Claims**

1. An expandable liquid unsaturated polyester resin composition adapted to expand and cure, by its reaction exotherm, into a low-density polyester resin foam product, which composition comprises:

a. a liquid unsaturated polyester resin in solution with an ethylenically unsaturated monomer subject to cross-linking by catalysis with a peroxide catalyst by its own reaction exotherm on addition of the peroxide catalyst;

b. a sulfonyl hydrazide moiety present in an amount of from about 0.1 to 15 phr as a foaming agent;

c. a cobalt accelerator present in an amount sufficient to promote the cure of the polyester resin;

d. a peroxide catalyst activated at a temperature below about 100°F, which catalyst is present in an amount to provide free radicals on decomposition sufficient to cross-link the polyester resin; and

e. a redox halogen-containing compound selected from the group consisting of halogens, halogen acids and halogen-containing compounds which provide the halogens or halogen acid compounds during reaction, the halogen-containing compounds present in an amount of from about 0.01 to 10 phr to permit, during the polyester resin reaction exotherm, the substantial decomposition of the foaming agent to precede selectively the exothermic gelation and curing of the polyester resin composition.

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### 3,920,590
### LOW-DENSITY POLYESTER RESIN FOAMS AND METHOD OF PREPARATION

**Richard L. Jacobs, Yorba Linda; Donald A. Backley, Garden Grove; James V. Simpson, Anaheim, all of Calif., and Walter Beck, Bedford, Mass., assignors to Stepan Chemical Company, Northfield, Ill.**

**Filed July 18, 1974, Ser. No. 489,824**
**Int. Cl.[2] C08J 9/00; C08L 67/06**
**U.S. Cl. 260—2.5 N** **22 Claims**

1. An expandable liquid unsaturated polyester resin composition which comprises in combination:

a. a liquid unsaturated polyester resin in solution with an ethylenically unsaturated monomer and subject to cross-linking by a peroxide -curing agent;

b. a peroxide-curing agent activated at temperatures below about 100°F which provides free radicals on decomposition in an amount to effect cross-linking of the polyester resin;

c. an expanding amount of from about 0.1 to 15 phr of a blowing agent which provides a sulfonyl hydrazide moiety; and

d. an activating amount of a cobalt activator to promote the cure of the polyester resin,

the cobalt activator present in an amount of from about 0.5 to 5.0 phr and the peroxide-curing agent in an amount of from about 3.0 to 10.0 phr, the cobalt activator and peroxide-curing agents in combination permitting the substantial decomposition of the sulfonyl hydrazide blowing agent prior to gelation of the polyester resin.

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### 3,920,591
### LOW-DENSITY POLYESTER RESIN FOAMS AND METHOD OF PREPARATION

**Richard L. Jacobs, Yorba Linda; Donald A. Backley, Garden Grove; James V. Simpson, Anaheim, all of Calif., and Walter Beck, Bedford, Mass., assignors to Stepan Chemical Company, Northfield, Ill.**

**Filed July 18, 1974, Ser. No. 489,821**
**Int. Cl.[2] C08J 9/00; C08L 67/06**
**U.S. Cl. 260—2.5 N** **25 Claims**

1. An expandable liquid unsaturated polyester resin composition adapted to expand and cure, by its reaction exotherm, into a low-density polyester resin foam product, which composition comprises:

a. a liquid unsaturated polyester resin in solution with an ethylenically unsaturated monomer subject to cross-linking by catalysis with a peroxide catalyst by its own reaction exotherm on addition of the peroxide catalyst;

b. a sulfonyl hydrazide moiety present in an amount of from about 0.1 to 15 phr as a foaming agent;

c. a cobalt accelerator present in an amount sufficient to promote the cure of the polyester resin;

d. a peroxide catalyst activated at a temperature below about 100°F, which catalyst is present in an amount to provide free radicals on decomposition sufficient to cross-link the polyester resin; and

e. a redox amine compound selected from the group consisting of alkyl amines, alkanol amines, ammonia, alicyclic amines, alkene amines, an alkyl-substituted amino alkyl phenol, an alkyl-substituted heterocyclic amine and poly $C_2$–$C_4$ alkylene polyamine, which amine compounds are present in an amount of from about 0.01 to 10 phr to permit, during the polyester resin reaction exotherm, the substantial decomposition of the foaming agent to precede selectively the exothermic gelation and curing of the polyester resin composition.

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### 3,920,592
### METHOD FOR PRODUCING PAPER COATING BINDER INVOLVING GRAFTING UNSATURATED ACRYLATE MONOMERS ONTO PROTEINACEOUS SUBSTRATE IN WATER

**Gerald M. Dykstra, Round Lake, and Rabon L. Hollingsworth, Hoffman Estates, both of Ill., assignors to Central Soya Company, Inc., Fort Wayne, Ind.**

**Filed Aug. 1, 1973, Ser. No. 384,582**
**Int. Cl.[2] C08F 289/00**
**U.S. Cl. 260—8** **1 Claim**

1. A method of producing a paper coating comprising:

dispersing a proteinaceous substrate in water, said proteinaceous substrate being a member selected from the class consisting of isolated soy protein and casein,

adding a seed emulsion to the dispersion of said proteinaceous substrate, said seed emulsion being a member

selected from the class consisting of styrene-butadiene polymers, polyvinyl acetate homopolymers and multipolymers, alkyl acrylate and methacrylate homopolymers and multipolymers, polyvinyl chloride and polyvinylidene chloride homopolymers and multipolymers, said seed emulsion being present in an amount of from about 0.01% to about 50% of said resulting graft polymer, the solids content of said dispersion being adjusted to between about 0.01% and about 31%,

adding a free radical precursor to the dispersion,

thereafter adding to said dispersion a styrene monomer and a second monomer selected from the class consisting of an alkyl acrylate, an alkyl methacrylate, or a combination thereof wherein the alkyl group has from 1–10 carbon atoms, each of said monomers being added in an amount sufficient to constitute from about 16% to about 34% of the graft polymer resulting from the reaction of said monomers with said proteinaceous substrate, said precursor being added during monomer addition until an amount between about 0.001% and about 10% of the combined monomer weight is achieved,

maintaining the temperature during monomer addition within the range of 40°C. and 75°C. and until the free monomer content is less than 1% to achieve a graft polymer having a particle size in the range of about 0.05 microns to about 0.25 microns, and

blending said graft polymer with a pigment to provide a coating having a solids content of from about 15% to about 67%.

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**3,920,593**

## PROCESS FOR THE PREPARATION OF POLYAMIDE FOAM PLASTICS

**Robert A. Q. Adama, Den Haag, and Marten H. B. van der Beek, Pijnacker; both of Netherlands, assignors to Stamicarbon, N.V., Geleen, Netherlands**

**Continuation of Ser. No. 108,413, Jan. 21, 1971, abandoned. This application Aug. 23, 1973, Ser. No. 390,717**

**Claims priority, application Netherlands, Jan. 21, 1970, 7000810**

**Int. Cl. C08g** *53/10*

**U.S. Cl. 260—2.5 N** **11 Claims**

**1.** In a process for preparing foamed polyamide materials by anionically polymerizing lactam monomers in the presence of blowing agents and pore-controlling agents, the improvement for controlling the size and number of pores and the thickness of the partition walls to produce a substantially uniformed foamed material consisting essentially in adding before polymerizing the combination of (1) at least one substance having an open cell structure, and being a member of the group of

*a.* porous inorganic substances selected from the group consisting of expanded perlite, expanded vermiculite, pumice, lava and silicon dioxide in porous form, and

*b.* synthetic expanded porous resin having a melting or softening temperature which is higher than the polymerization temperature of the said lactam monomers to be polymerized, and selected from the class consisting of foamed urea formaldehyde resin and foamed phenol formaldehyde resin,

said porous substances having a particles size ranging between about 60 and 110 mesh and present in said lactams monomers to be polymerized in a quantity of about 0.1 to 2 weight %; and

(2) at least one organosiloxane present in said lactams monomers to be polymerized in a quantity of about 0.1 to 1.5 weight %.

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**3,920,594**

## RESIN COMPOSITION FOR LAMINATES

**Shunichi Sato; Masaharu Kurata; Mineaki Tanigaichi; Fumiki Iguchi, and Kazuyoshi Iwasawa, all of Tokyo, Japan, assignors to Mitsubishi Gas Chemical Company, Inc., Tokyo, Japan**

**Filed July 2, 1974, Ser. No. 485,228**

**Claims priority, application Japan, July 4, 1973, 48-75408**

**Int. Cl.² C08G** *8/32*

**U.S. Cl. 260—19 R** **12 Claims**

**1.** A resin composition for laminates which comprises a drying oil-modified resol phenolic resin and a resol water-soluble phenolic resin, characterized in that the composition additionally contains at least one amine-modified resol phenolic resin and at least one halogenated epoxy-drying oil-modified resol phenolic resin, and the proportion of the amine-modified resol phenolic resin is 20 to 60 % by weight, the proportion of the halogenated epoxy-drying oil-modified resol phenolic resin is 10 to 60 % by weight, the proportion of the drying oil-modified resol phenolic resin is 15 to 55 % by weight, and the proportion of the resol water-soluble phenolic resin is 5 to 20 % by weight, based on the weight of the whole composition.

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**3,920,595**

## HIGH SOLIDS ALKYD COATING COMPOSITIONS

**Carl C. Anderson, Hartland, Wis.; Roger M. Christenson, Gibsonia, Pa., and Egon Fritz Wiegmann, Saint Saulve, France, assignors to PPG Industries, Inc., Pittsburgh, Pa.**

**Filed Apr. 10, 1974, Ser. No. 459,515**

**Int. Cl.² C09D** *3/52, 3/66*

**U.S. Cl. 260—22 CQ** **19 Claims**

**1.** A coating composition having a solids content of at least 70 percent by weight, the vehicle comprising a blend of:

A. from about 10 to about 70 percent by weight of an alkyd resin comprising the reaction product of a polyfunctional alcohol, a polyfunctional acid or acid anhydride, and an oil or oil fatty acid;

B. from about 25 to about 70 percent by weight of a reactive liquid having two or more hydroxyl groups, said reactive liquid being selected from the group consisting of polyether polyols, polyester polyols, polyhydric alcohols and mixtures thereof; and

C. from about 5 to about 50 percent by weight of a crosslinking agent, said crosslinking agent being selected from the group consisting of aminoplast resins, expoxy resins and isocyanate-terminated compounds.

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**3,920,596**

## SIZING AGENT FOR GLASS FIBERS

**Jun-ichi Furukawa, and Yoshinao Kono, both of Wakayama, Japan, assignors to Kao Soap Co., Ltd., Tokyo, Japan**

**Filed June 12, 1974, Ser. No. 478,441**

**Claims priority, application Japan, June 27, 1973, 48-72520**

**Int. Cl.² C08L** *67/08, 67/06*

**U.S. Cl. 260—22 R** **7 Claims**

**1.** In a sizing agent composition for glass fibers comprising a film-forming material, a lubricant for glass fibers, a coupling agent for glass fibers and an antistatic agent, the improvement which comprises employing as the film-forming material an oil-in-water type emulsion of an unsaturated polyester obtained by the reaction of (*a*) 1 mole of a dibasic acid component containing at least 50 mole percent of a material selected from the group consisting of fumaric acid, maleic anhydride

and mixtures thereof, (*b*) 1 to 1.5 moles of a diol component containing at least 30 mole percent of an adduct of 2 to 10 moles of an alkylene oxide to bisphenol A, with (*c*) an emulsifier selected from the group consisting of an adduct of 5 to 200 moles of an alkylene oxide to castor oil, an adduct of 5 to 200 moles of an alkylene oxide to hydrogenated castor oil and polyethylene glycol having an average molecular weight of 1000 to 6000, the amount of said emulsifier ( *c*) being 5 to 30 parts by weight per 100 parts by weight of the sum of the polyester starting materials (*a*) and (*b*), and incorporating the resulting unsaturated polyester into water together with an antistatic agent, said antistatic agent being a triethanolamine salt of an oxyacid of a metal selected from the group consisting of titanium, antimony, molybdenum, vanadium, aluminum, zinc, tin, germanium, zirconium, tungsten, boron and tellurium, the composition containing from 1 to 10 parts by weight of said antistatic agent per 100 parts by weight of said emulsion, calculated as the solids.

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## 3,920,597
## PAINT COMPOSITIONS AND METHOD OF THEIR PRODUCTION

**Peter Francis Nicks, Maidenhead, and William Anthony Ryan, Finchley, both of England, assignors to Imperial Chemical Industries Limited, London, England**

**Filed Aug. 16, 1974, Ser. No. 498,214**

**Claims priority, application United Kingdom, Sept. 10, 1973, 42430/73**

**Int. Cl.[2] C09D** *3/64*

**U.S. Cl. 260—22 R** **10 Claims**

**1.** In a method of producing a non-aqueous paint composition, comprising a pigmented solution of a water-insoluble film forming base resin which is a drying oil-modified alkyd resin in water-immiscible liquid, the improvement wherein (1) at least a proportion of the pigment is treated in dispersion in a water-immiscible liquid with an auxiliary resin which is a drying oil-modified alkyd resin containing more than 50% by weight based on the total weight of the resin of a hydrophilic moiety derived from a poly(ethylene glycol) of molecular weight 400–1500, the auxiliary resin being used in a proportion of not less than 1% by weight based on the total resin content of the paint composition, and (2) there is also incorporated into the paint composition, after the treatment of the pigment with said auxiliary resin, an amount of 1–10% by weight based on the total resin content of the paint of a compound which is soluble in the solution of base resin in water-immiscible liquid and which in water has detergent properties, said compound being selected from the group consisting of compounds having the chemical structure of the auxiliary resin and synthetic non-ionic or anionic surfactants.

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## 3,920,598
## NON-IONIC POLYURETHANE DISPERSIONS HAVING SIDE CHAINS OF POLYOXYETHYLENE

**Helmut Reiff; Jurgen Lienert, both of Cologne; Roland Nast; Harro Witt, both of Dormagen-Hackenbroich, and Pramod Gupta, Bedburg-Erft, all of Germany, assignors to Bayer Aktiengesellschaft, Germany**

**Filed Mar. 18, 1974, Ser. No. 452,180**

**Claims priority, application Germany, Mar. 23, 1973, 2314513**

**Int. Cl.[2] C08G** *18/76*

**U.S. Cl. 260—29.2 TN** **7 Claims**

**1.** In the preparation of a polyurethane latex by a process wherein a difunctional organic compound having reactive hydrogen atoms and an organic diisocyanate are reacted together and the resulting polyurethane is dispersed in water, the improvement which comprises reacting the said compound having reactive hydrogens with an organic diisocyanate having a molecular structure which contains an allophanate or biuret group attaching a side chain having repeating $-O-CH_2-CH_2-$ groups thereto.

## 3,920,599
## LATICES OF DIALLY DIMETHYL AMMONIUM CHLORIDE/ACRYLAMIDE POLYMERS

**John R. Hurlock, Hickory Hills; Edward G. Ballweber, Glenwood, and Lawrence J. Connelly, Oak Lawn, all of Ill., assignors to Nalco Chemical Company, Oak Brook, Ill.**

**Filed Mar. 29, 1974, Ser. No. 456,340**

**Int. Cl.[2] C08F** *2/32*

**U.S. Cl. 260—29.64** **2 Claims**

**1.** A stable water-in-oil polymer emulsion selected from the group consisting of a diallyl dimethyl ammonium chloride homopolymer and copolymers of diallyl dimethyl ammonium chloride/acrylamide prepared by a method which comprises (a) preparing a water-in-oil monomer emulsion; (b) polymerizing with agitation in the presence of a low HLB emulsifier and a free radical initiator at a temperature of 75°–90°C for a period of about 6–7 hours to produce the water-in-oil polymer emulsion; and (c) recovering said polymer with a latex Brookfield viscosity of about 300–5000 cps and an intrinsic viscosity of about 0.50–1.00 and wherein the concentration of the polymer lies between 20–50% by weight of the emulsion and the particle size is within the range of $5\mu\mu$ to $5\mu$, said polymer emulsion being characterized by rapid inversion in water to a solution in the presence of a hydrophilic surfactant.

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## 3,920,600
## ADHESIVE COMPOSITIONS

**Leo Ahramjian, Wilmington, Del., assignor to E. I. Du Pont de Nemours & Co., Wilmington, Del.**

**Filed Jan. 8, 1974, Ser. No. 431,786**

**Int. Cl.[2] C08F** *29/12*

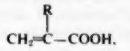
**U.S. Cl. 260—29.7 UA** **14 Claims**

**1.** A composition suitable in the formation of pressure-sensitive adhesive coatings, said composition comprising:

A. an aqueous dispersion of a copolymer made by polymerizing in the absence of surface active agents containing carboxylate groups (1) an aqueous suspension of about 90.0–99.6 mole percent of chloroprene monomer and about 0.4–10.0 mole percent of an $\alpha,\beta$-unsaturated carboxylic acid monomer in the presence of (2) about 3–10 parts of polyvinyl alcohol and 0.2–2 parts of an organic, sulfur-containing chain transfer agent selected from the group consisting of dialkyl xanthogen disulfides and alkyl mercaptans per 100 parts of polyvinyl alcohol and 0.2–2 parts of an organic, sulfur-containing chain transfer agent selected from the group consisting of dialkyl xanthogen disulfides and alkyl mercaptans per 100 parts by weight of total monomers (1); the proportion of gel in the copolymer being about 10–95 percent; and

B. an alkylated melamine-aldehyde resin in the proportion of 10–15 parts per 100 parts by weight of the copolymer A(1), the resin having a softening point of about −20° to +70°C.; with the provisos that

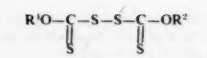
a. the $\alpha,\beta$-unsaturated carboxylic acid comonomer of part A, above, is represented by the following formula:



wherein R is hydrogen, an alkyl radical containing 1-4 carbon atoms, or the carboxymethyl group;

b. alkyl mercaptan chain transfer agents of part A, above, have 4–20 carbon atoms;

c. dialkyl xanthogen disulfide chain transfer agents of part A, above, are represented by the following formula:



wherein each of $R^1$ and $R^2$ independently is an alkyl radical having 1–8 carbon atoms; and

d. up to about 10 percent of the chloroprene can be replaced with another copolymerization monomer which does not contain a free carboxylic group.

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### 3,920,601
### PROCESS FOR PREPARING AQUEOUS EMULSIONS OF SYNTHETIC POLYMERIC ELASTOMER

**Akira Yoshioka; Akira Suzuki; Takaaki Sugimura, and Osanori Yamamoto, all of Kawasaki, Japan, assignors to Nippon Zeon Co., Ltd., Tokyo, Japan**

**Filed Mar. 18, 1974, Ser. No. 451,967**
**Int. Cl. C08d** *11/04, 5/02*
**U.S. Cl. 260—29.7 N** **5 Claims**

**1.** In a process for the preparation of an aqueous emulsion containing a synthetic polymeric elastomer, wherein water, an emulsifier, and a hydrocarbon solvent solution of said synthetic polymeric elastomer are admixed to form a basic aqueous solution and the solvent is removed from the resultant basic aqueous emulsion by evaporation to obtain the final aqueous emulsion, the improvement comprising further adding an organic cyanide compound to the admixing step, whereby the organic cyanide compound prevents said basic emulsion from separating into phases; removing from the basic emulsion, by evaporation, said hydrocarbon solvent simultaneously with said organic cyanide compound, thereby inhibiting coagulum formation; and recovering the final aqueous emulsion.

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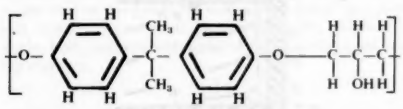
### 3,920,602
### THERMOPLASTIC NYLON MOLDING RESINS

**William T. Freed, Madison, N.J., assignor to Celanese Corporation, New York, N.Y.**

**Filed Aug. 12, 1974, Ser. No. 496,608**
**Int. Cl.² C08L** *63/02, 77/10*
**U.S. Cl. 260—37 N** **7 Claims**

**1.** An improved thermoplastic molding resin comprising a synthetic linear polyamide polymer having a relative viscosity in the range of from 35 to 100; from about 5 to about 60 weight percent, based on the total thermoplastic molding resin, of a reinforcing agent intimately mixed with said polymer; and from above 0.5 to about 3 weight percent, based on the total thermoplastic molding resin, of a thermoplastic phenoxy resin having the repeating structure:



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### 3,920,603
### REINFORCED RESIN COMPOSITIONS AND ARTICLES FORMED THEREOF

**Vance A. Stayner, and Barry L. Sloss, both of P.O. Box 63, Sugar Grove, Ill. 60554**

**Filed Oct. 24, 1973, Ser. No. 401,208**
**Int. Cl.² C08K** *7/20;* **C08L** *67/06*
**U.S. Cl. 260—40 R** **5 Claims**

**1.** A hardenable composition comprising about 10 to 60 percent by weight of a curable, synthetic polyester resin, about 1 to 30 percent by weight of microscopically sized glass spheres, about 10 to 60 percent by weight of Suzorite mica platelets, and about 20 to 70 percent by weight of aluminum trihydrate particles.

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### 3,920,604
### PRODUCTION OF POWDERY, FILLER-CONTAINING RUBBER MIXTURES AND THE USE THEREOF IN THE MANUFACTURE OF TIRE TREADS

**Gerhard Berg; Karl-Heinz Nordsiek; Neithart Sommer; Egge Barnstedt, and Gerhard Cuntze, all of Marl, Germany, assignors to Chemische Werke Huels Aktiengesellschaft, Marl, Germany**

**Filed Dec. 5, 1973, Ser. No. 421,819**
**Claims priority, application Germany, Dec. 9, 1972, 2260340**
**Int. Cl.² C08J** *3/14, 3/20*
**U.S. Cl. 260—42.54** **14 Claims**

**1.** a process for the preparation of discrete, pourable, powdery, non-caking filler-containing elastomer particles having an average diameter of 10–1000 $\mu$, which comprises:

a. admixing i) a solution of an elastomeric polymer, said elastomeric polymer having a solution viscosity of 1–7 dl/gm. and being selected from the group consisting of polybutadienes having a vinyl group content of from 8 to 50% and copolymers of butadiene with 10–60% by weight styrene in which the vinyl group content in the polybutadiene present is from 8 to 30% in a volatile, inert organic solvent which solvent has an atmospheric pressure boiling point of about −5° to +85° C., with ii) 25–250 parts by weight per 100 parts by weight of said polymer of a solid, finely divided elastomer filler selected from the group consisting of silicic acid and carbon black to form a homogeneous fluid mixture consisting essentially of said filler and said elastomer solution; and

b. expanding said homogeneous fluid mixture from a higher pressure and an initial temperature of 50°–280° C. at which said solvent is in the liquid phase across a pressure differential of about 5–20 atmospheres to a lower pressure at which said solvent flash evaporates to form said filler-containing elastomer particles having a residual solvent content of less than about 1% by weight.

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### 3,920,605
### METAL-CONTAINING ORGANIC HIGH MOLECULAR COMPOUND REINFORCED WITH PARTICULATE ORGANIC OR INORGANIC MATERIAL

**Hiroshi Sato; Koji Takahashi; Sadaaki Shigeta, and Yoshitaka Abe, all of Ohtake, Japan, assignors to Mitsubishi Rayon Co., Ltd., Tokyo, Japan**

**Continuation-in-part of Ser. No. 328,150, Jan. 30, 1973, abandoned, which is a continuation-in-part of Ser. No. 211,661, Dec. 23, 1971, Pat. No. 3,840,505. This application Aug. 27, 1974, Ser. No. 500,924**
**Claims priority, application Japan, Dec. 24, 1970, 45-117283**
**Int. Cl.² C08K** *3/08, 3/34| 7/04, 7/14*
**U.S. Cl. 260—42.17** **8 Claims**

**1.** A filler-reinforced, metal-containing, organic high molecular compound which comprises: (1) 100 parts by weight of a copolymer of 45 – 97% by weight of at least one member selected from the group consisting of acrylonitrile and methacrylonitrile, with 55 – 3% by weight of at least one member selected from the group consisting of unsaturated carboxylic ester, unsaturated carboxylic acid and unsaturated carboxylic amide each of which is copolymerizable with acrylonitrile or methacrylonitrile, which copolymer is stabilized through cross-linking with at least one metallic compound of a transition metal of the 4th Period of the Periodic Table, a metal of Group II of the Periodic Table or a mixture thereof, said metal in ion or salt form being coordination bonded with the nitrile groups of the copolymer in molar ratios of from 1 : 32 to 32 : 32, and (2) 0.5 – 9000 parts by weight of at least one inorganic or organic filler dispersed in the metal-containing, organic high molecular compound.

## 3,920,606
## NONFLAMMABLE MOLDING COMPOSITIONS OF STYRENE POLYMERS

**Klaus Diebel, and Helmut Birkner, both of Marl, Germany, assignors to Chemische Werke Huels, A.G., Marl, Germany**

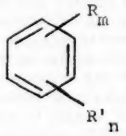
**Continuation-in-part of Ser. No. 213,738, Dec. 29, 1971, Pat. No. 3,817,912. This application Apr. 8, 1974, Ser. No. 459,097**

**Claims priority, application Germany, Dec. 31, 1970, 2064677**

**Int. Cl.[2] C08K** *5/03*

**U.S. Cl. 260—45.7 R** **14 Claims**

1. In a nonflammable thermoplastic polystyrene molding composition containing 1-20%, based on the styrene polymer, of at least one brominated polyalkyl benzene, the improvement wherein the brominated polyalkyl benzene is a compound of the formula



wherein R is bromomethyl or dibromomethyl; R′ is alkyl of 1–3 carbon atoms, at least one R′ being ortho to each R; *m* is the integer from 2 or 3; and n is an integer from 1 to 3, inclusive, the sum of *m* and *n* being from 3 to 5, inclusive.

## 3,920,607
## STABILIZED POLYMER COMPOSITIONS

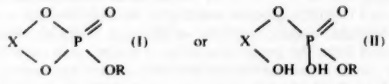
**Gerald Scott, Knowle, and Kenneth John Humphris, Frimley, near Camberley, both of England, assignors to J. A. Kemp & Co., London, England**

**Filed Aug. 24, 1973, Ser. No. 391,257**

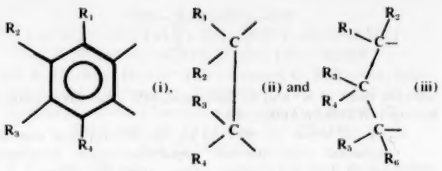
**Int. Cl.[2] C08F** *6/00*; **C08G** *83/00*

**U.S. Cl. 260—45.8 R** **17 Claims**

1. An oxidation-resistant polymer composition which comprises a synthetic polymer and, as antioxidant, at least one phosphate of the formula:



in which R represents a hydrogen or 1/x of a metal ion of valency *x*, said metal being selected from zinc, calcium, barium, cadmium, tin, iron, cobalt, nickel, copper and manganese, or an ammonium or substituted ammonium ion, a secondary or tertiary alkyl radical or an aryl radical which contains at least one alkyl group in the ortho-position to the attached oxygen atom said alkyl group being branched in the α-position, and X represents a hydrocarbon or substituted hydrocarbon radical selected from radicals of the formulae:



in which each of $R_1$ to $R_6$, which may be the same or different, represents an alkyl, aryl or carboxyl radical or a halogen atom or two adjacent such R radicals together form an alkylene radical or, in the case of formulae (ii) and (iii) a valency bond, in an amount from 0.001 to 5% by weight based on the weight of the polymer.

## 3,920,608
## FIRE RETARDANT POLYESTER RESINS

**Robert M. Murch, Ashton, Md., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.**

**Filed June 19, 1974, Ser. No. 480,913**

**Int. Cl.[2] C08G** *6/00*

**U.S. Cl. 260—45.9 NP** **10 Claims**

1. A method of enhancing the fire retardancy characteristic of general purpose unsaturated polyester resins, which comprises:

reacting an alcohol with an adduct selected from the class consisting of the equimolar adduct of phosphorus pentachloride and aniline and the equimolar adduct of phosphorus pentachloride and allylamine, in an alcohol-to-$PCl_5$ mole ratio of 3:1, to form an alkoxy derivative; and adding said alkoxy derivative to said polyester resin in an amount from about 5 to about 20 weight percent of the total combined weight.

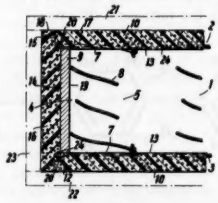
## 3,920,609
## METHOD OF PRODUCING A SPRING CORE MATTRESS

**Walter Lehmann, Pleidelsheim, Germany, assignor to Mirabed AG, Zug, Switzerland**

**Continuation of Ser. No. 289,565, Sept. 15, 1972, which is a continuation of Ser. No. 66,789, Aug. 25, 1970, abandoned. This application July 17, 1974, Ser. No. 489,180**

**Int. Cl.[2] A47C** *23/12*; **B29D** *27/04*

**U.S. Cl. 264—46.5** **18 Claims**



1. A method of producing a spring cushion body in which a coil spring core is covered with and secured to foamed, elastomeric material, said spring core being formed by assembling a plurality of coil springs into a spring core having end coils defining a surface with partial segments of the end coils lying on the periphery of said surface, said method comprising placing a side wall band around the sides of said spring core with one peripheral edge adjacent said peripheral segments of said end coils, positioning said spring core with said side wall band in a mold with a sheet of foamed, elastomeric material covering the end coils defining said surface and with a space between the side walls of the mold and sides of said spring

core completely surrounding the sides of the spring core, said space being closed on the inner side by said side wall band and on the other sides by said mold to provide a completely enclosed space, admitting a foamable and solidifiable elastomeric material to said space and permitting the material to foam and solidify to form a foamed elastomeric material filling said space and bonded to said sheet of foamed, elastomeric material and to said side wall band, so that said foamed material forms an integral cover of said surface of said end coils and the sides of said core, said peripheral segments of said end coils being embedded in the foamed material to secure said end coils to the casing formed by said foamed material.

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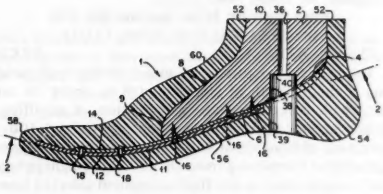
## 3,920,610
## METHOD OF MAKING AND TAILORING PROSTHETIC FEET

**Eugene Wagner, c/o Wagner's Orthopedic Supply Co., 375 W. 4th South St., Salt Lake City, Utah 84110**

**Division of Ser. No. 336,507, Feb. 28, 1973, Pat. No. 3,833,941. This application Apr. 24, 1974, Ser. No. 463,757**
**Int. Cl.² B29D** *27/04*
**U.S. Cl. 264—46.9** **10 Claims**



**1.** The method of making a prosthetic foot comprising forming a keel having a diminished heel portion, a substantially flat arch portion, a curved instep portion and a rounded lower front end portion, fastening to said flat arch portion the rear end of a reinforcing member comprising a strip of highly resilient synthetic resin the front end of which extends almost to the end of the toe to be formed around it, and molding a soft resilient foam coating comprising toe portion, instep, ankle, heel and arch under and around said keel and reinforcing member.

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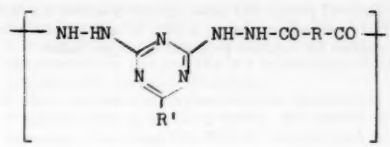
## 3,920,611
## POLYACYL-DIHYDRAZINO-S-TRIAZINES AND THEIR PREPARATION

**Marija del Rio, Obernburg am Main; Joachim Behnke, Miltenberg; Michael Wallrabenstein, Worth am Main, and Dieter Frank, Elsenfeld, all of Germany, assignors to Akzona Incorporated, Asheville, N.C.**

**Filed May 20, 1974, Ser. No. 471,504**
**Claims priority, application Germany, May 24, 1973, 2326473**
**Int. Cl.² C08G** *73/08*
**U.S. Cl. 260—47 CP** **12 Claims**

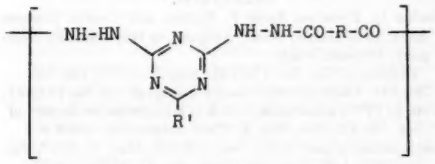
**1.** A fiber-forming linear polyacyl-dihydrazino-s-triazine consisting essentially of recurring structural units of the formula



in which

R is a divalent aromatic radical of 6 to 15 carbon atoms, and R′ is alkyl of 1 to 4 carbon atoms, phenyl, alkoxy of 1 to 4 carbon atoms, phenoxy, dialkylamino of 2 to 8 carbon atoms, piperidyl, morpholyl or phosphonic acid dialkyl ester of 2 to 8 carbon atoms.

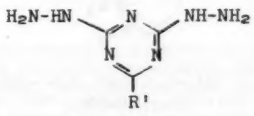
**7.** A process for the production of a polyacyl-dihydrazino-s-triazine with recurring structural units of the formula



wherein R is a divalent aromatic radical and R′ is alkyl of 1 to 4 carbon atoms, phenyl, alkoxy of 1 to 4 carbon atoms, phenoxy, dialkylamino of 2 to 8 carbon atoms, piperidyl, morpholyl or phosphoric acid dialkyl ester of 2 to 8 carbon atoms, which process comprises:

polycondensing at a temperature of about −10°C. to +60°C. and in the presence of an acid acceptor while stirring and drawing off the heat of reaction

a. at least one 2,4-dihydrazino-s-triazine of the formula



in which R′ has the same meaning given above, with (b) at least one aromatic dicarboxylic acid halide.

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## 3,920,612
## PREPARATION OF FILM FORMING POLYMER FROM CARBOCYCLIC AROMATIC DIAMINE AND ACYL HALIDE OF TRIMELLITIC ACID ANHYDRIDE

**James R. Stephens, Gary, Ind., assignor to Standard Oil Company, Chicago, Ill.**

**Continuation-in-part of Ser. Nos. 252,557, Jan. 21, 1963, abandoned, Ser. No. 336,857, Jan. 10, 1964, abandoned, and Ser. No. 535,367, March 18, 1966, abandoned. This application Nov. 25, 1966, Ser. No. 596,765**
**Int. Cl.² C08G** *73/14*
**U.S. Cl. 260—47 CP** **13 Claims**

**1.** A process for preparing high molecular weight solid polymers having film-forming properties and being soluble in an organic solvent, which process comprises reacting essentially equimolar amounts of a carbocyclic aromatic primary diamine and an acyl halide derivative of trimellitic anhydride which contains at least one acyl halide group and that in the 4-ring position, in said organic solvent, under substantially anhydrous conditions, and for a period of time and at a temperature, below 150°C., controlled to produce a polymer with

free carboxyl groups and amide groups available for further reaction, said polymer being soluble in said organic solvent and wherein the reaction produces hydrogen halide.

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**3,920,613**

## AMINE-MODIFIED CONDENSATION POLYMERS AND RAPID CURING ADHESIVE COMPOSITIONS PREPARED THEREFROM

**Harlan G. Freeman; Gene F. Baxter, and George Graham Allan, all of Seattle, Wash., assignors to Weyerhaeuser Company, Tacoma, Wash.**

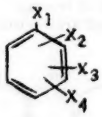
**Division of Ser. No. 174,942, Aug. 25, 1971, Pat. No. 3,784,515, which is a continuation-in-part of Ser. No. 113,681, Feb. 8, 1971, abandoned, which is a continuation-in-part of Ser. No. 821,996, May 5, 1969, abandoned, which is a continuation-in-part of Ser. No. 639,270, May 18, 1967, Pat. No. 3,518,159. This application Oct. 23, 1973, Ser. No. 408,408**

**Int. Cl.[2] C08G** *12/40, 12/38*

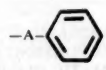
**U.S. Cl. 260—67.6 R** **51 Claims**

1. A rapid curing adhesive composition comprising

a. an amine-modified condensation polymer comprising the reaction product of an aminoplast containing reactive alkylol groups with a primary aromatic amine of the formula



wherein $X_1$ is $-NH_2$ or $-CH_2NH_2$; $X_2$ is $-NH_2$, $-CH_2NH_2$ or $-OH$; $X_3$ is $-NH_2$, $-CH_2NH_2$, $-NO_2$, $-OH$, alkyl of 1 to 5 carbon atoms, hydrogen, halogen, halogenated alkyl, alkyoxy or



$X_4$ is hydrogen, alkyl of 1 to 4 carbon atoms or aryl; and A is $-SO_2-$, $-NH-$, $-O-$, $-S-$, $-C\equiv C-$, $-S-S-$, $-N=N-$ or

where $Y_1$ and $Y_2$ are hydrogen or alkyl or 1 to 3 carbon atoms and $z$ is 0, 1 or 2; the amount of said amine being at least 0.1 part by weight per part of said aminoplast; and b. a curing agent reactable with said modified condensation polymer at ambient temperatures, the amounts of said modified polymer and curing agent being sufficient to cause said composition to rapidly become insoluble and infusible at ambient temperatures.

**3,920,614**

## HIGH SOIL RELEASE OIL- AND WATER-REPELLENT COPOLYMER

**Kazusuke Kirimoto, and Takao Hayashi, both of Yokohama, Japan, assignors to Asahi Glass Company, Ltd., Tokyo, Japan**

**Filed Nov. 26, 1973, Ser. No. 418,933**

**Claims priority, application Japan, Nov. 24, 1972, 47-117109**

**Int. Cl.[2] C08F** *214/18, 220/12*

**U.S. Cl. 260—63 UY** **9 Claims**

1. An oil and water-repellent copolymer which is characterized by high soil release properties, which comprises: at least 25 weight percent of a fluoroalkyl monomer, from 5 – 35 weight percent of acrylonitrile or methacrylonitrile, and 5 – 50 weight percent of a polymerizable acrylate or methacrylate having the formula:

$$CH_2=CR^1COO(CH_2CH_2O)_nR^2$$

wherein $R^1$ and $R^2$ may be hydrogen or methyl and $n$ is an integer from 3 – 50.

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**3,920,615**

## PRODUCTION OF ALKYLARYL SULFONATES INCLUDING THE STEP OF DEHYDROGENATING NORMAL PARAFFINS WITH AN IMPROVED CATALYST

**Shuan K. Huang, Creve Coeur, Mo., assignor to Monsanto Company, St. Louis, Mo.**

**Filed Aug. 30, 1974, Ser. No. 501,910**

**Int. Cl.[2] C07C** *3/28, 77/00, 143/24*

**U.S. Cl. 260—683.3** **10 Claims**

1. The process for producing mono-olefins from paraffins having a chain length of from about 8 to about 24 carbon atoms which comprises passing a mixture of paraffins and hydrogen at an LHSV of from about 1 to about 100, at a temperature of from about 400°C. to about 650°C. in contact with a catalyst comprising from about 0.002 weight percent to about 5 weight percent of a first component selected from the group consisting of Group IB metals, oxides of Group IB metals, and mixtures thereof; from about 0.005 weight percent to about 5 weight percent of a second component selected from the group consisting of noble metals of the platinum and palladium families, noble metal oxides of the platinum and palladium families, and mixtures thereof; the first and second components being deposited on the surface of an alumina catalyst base having a surface area of at least 10 square meters per gram, an acidity factor less than 2.0, and a macropore volume of at least 0.005 cc/g; wherein the improvement comprises calcining the alumina catalyst base at a temperature of at least about 800°C. for a sufficient time to reduce the surface area of the alumina catalyst base to less than 150 $m^2/g$.

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**3,920,616**

## ALKOXY DERIVATIVES OF HEXACHLOROPHOSPHONITRILE CYCLIC TRIMER

**Robert M. Murch, Ashton, Md., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.**

**Filed June 19, 1974, Ser. No. 480,911**

**Int. Cl.[2] C08G** *63/52*

**U.S. Cl. 260—75 T** **11 Claims**

1. A method for enhancing the fire retardancy characteristics of unsaturated general purpose polyester resins, which comprises based on total weight admixing from about 5 to 20% of an alkoxy derivative produced by the reaction of hexachlorophosphonitrile cyclic trimer and an alcohol selected from the group consisting of $\beta$-chloroethanol, 3,3,3-trichloropropanol, 1,3-dichloro-2-propanol, 2,3-dibromopropanol, methanol, ethanol, and 2,2,2-trichloroethanol with said unsaturated polyester resin; and curing said unsaturated polyester resin.

3,920,617

## SULFUR-CONTAINING POLYAMINE CURING AGENTS FOR POLYURETHANES AND METHOD FOR MAKING AND USING THE SAME

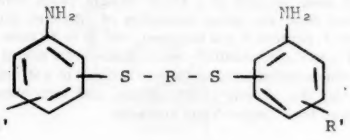
**Frank N. Hirosawa, Monterey Park, and Ming Hsing Lee, Glendale, both of Calif., assignors to Furane Plastics, Inc., Los Angeles, Calif.**

**Division of Ser. No. 60,742, Aug. 3, 1970, abandoned. This application Oct. 26, 1973, Ser. No. 410,233**

**Int. Cl.[2] C08G** *18/38*

**U.S. Cl. 260—77.5 AM** **12 Claims**

1. The process of curing an isocyanate terminated urethane prepolymer which comprises curing an isocyanate terminated urethane prepolymer with at least one compound selected from those of the formula:




wherein R is a hydrocarbon, and R′ is selected from the group consisting of hydrogen, halogens, and hydrocarbons.

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3,920,618

## NEW PHOTOPOLYMERS

**Kunihiro Ichimura, and Hideo Ochi, both of Yokohama, Japan, assignors to Director-General of the Agency of Industrial Science and Technology, Tokyo, Japan**

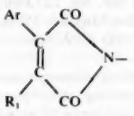
**Filed Oct. 5, 1973, Ser. No. 403,822**

**Claims priority, application Japan, Oct. 6, 1972, 47-100429; Oct. 6, 1972, 47-100430; Dec. 28, 1972, 48-3533**

**Int. Cl.[2] C08G** *69/44, 73/16, 63/00;* **C08F** *18/44*

**U.S. Cl. 260—78 UA** **14 Claims**

1. Photopolymers characterized by a vinyl polymer backbone having as photocrosslinking radicals α-substituted maleimido groups of the formula:




wherein Ar stands for a cyclic group of aromaticity and $R_1$ for a hydrogen atom.

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3,920,619

## PROCESS FOR CASTING METHACRYLIC ACID POLYMER PLATE

**Nobuo Kameda; Suehiro Tayama, and Tokuo Tamaki, all of Otake, Japan, assignors to Mitsubishi Rayon Co., Ltd., Japan**

**Filed July 18, 1973, Ser. No. 380,295**

**Claims priority, application Japan, July 27, 1972, 47-75265**

**Int. Cl.[2] C08K** *5/09, 5/10;* **C08F** *218/14, 230/00*

**U.S. Cl. 260—31.2 R** **18 Claims**

1. A process for casting a methacrylic acid polymer plate of improved flame retarding and antistatic properties by a bulk polymerization procedure, which comprises polymerizing in an enclosed mold a mixture consisting essentially of

A. methacrylic acid in an amount of 20 to 100% by weight based on the total weight of the monomer components (A), and (C), below,

B. water in an amount of 0.1 to 1 mole per mole of methacrylic acid and at least 1 part by weight based on 100 parts by weight of the monomer components (A), and (C) below, and

C. at least one ethylenically unsaturated compound copolymerizable with methacrylic acid and capable of forming a homogeneous, transparent solution when mixed with the components (A) and (B) at a temperature of 25°C, selected from the group consisting of

C-i. alkyl acrylates and alkyl methacryles, both having 1 to 3 carbon atoms in the alkyl moiety, the amount of the monomer (C-i) being 0 to 80% by weight based on the total weight of the monomer components (A) and (C);

C-ii. alkyl acrylates or methacrylates, the alkyl moiety having 4 to 12 carbon atoms, halogenated alkyl acrylates or methacrylates, the halogenated alkyl moiety having 2 or 3 carbon atoms, styrene and alkyl-substituted styrenes having 1 to 4 carbon atoms in the alkyl moiety, the amount of the monomer (C-ii) being 0 to 30% by weight based on the total weight of the monomer components (A) and (C);

C-iii. acrylic acid, acrylamide, acrylonitrile, diacetone acrylamide, maleic acid and itaconic acid, the amount of the monomer (C-iii) being 0 to 80% by weight based on the total weight of the monomer components (A) and (C); and

C-iv. methacrylic amide, methacrylonitrile, N-hydroxymethylacrylic amide, 2-hydroxyethyl methacrylate, 2-hydroxyethyl acrylate, glycidyl methacrylate, dimethylaminoethyl methacrylate, diethylaminoethylmethacrylate, N-alkylmaleimide, N-arylmaleimide and metal salts of methacrylic acid or acrylic acid, the amount of the monomer (C-iv) being 0 to 20% by weight based on the total weight of the monomer components (A) and (C), and, optionally 1 to 25 parts by weight, based on 100 parts by weight of the monomer components (A) and (C), of at least one compound selected from the group consisting of trialkyl phosphates, the alkyl moiety having 1 to 8 carbon atoms, triaryl phosphates, the aryl moiety having 6 to 14 carbon atoms, tris-halogenated alkyl phosphates, the alkyl moiety having 2 to 6 carbon atoms, tris-halogenated alkyl phosphonates, the alkyl moiety having 2 to 6 carbon atoms, and halogenated alkyl polyphosphonates, the alkyl moiety having 2 to 6 carbon atoms.

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3,920,620

## CURABLE COMPOSITIONS BASED ON ELASTOMERIC VINYLIDENE FLUORIDE COPOLYMERS, PROCESS FOR CURING THE COMPOSITIONS, AND THE CURED COMPOSITIONS

**Giovanni Ceccato; Sergio Geri, both of Milan, and Luigi Colombo, Busto Arsizio, all of Italy, assignors to Montedison S.p.A., Milan, Italy**

**Filed Oct. 5, 1973, Ser. No. 403,826**

**Claims priority, application Italy, Oct. 9, 1972, 30245/72**

**Int. Cl.[2] C08F** *28/00, 214/00*

**U.S. Cl. 260—79.5 C** **11 Claims**

1. Curable compositions comprising

I. 100 parts by weight of at least one saturated, elastomiere copolymer of vinylidene fluoride with at least one fluorinated or chloro-fluorinated, ethylenically unsaturated monomer copolymerizable therewith;

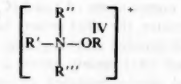
II. 1–40 parts by weight of an inorganic acids acceptor consisting of at least one substance selected from the group consisting of magnesium oxide, calcium oxide, lead monoxide, zinc oxide, lead basic phosphite and cationic complexes and chelates thereof;

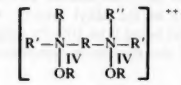
III. 0.5–10 parts by weight of at least one basic compound selected from the group consisting of alkaline earth - metal hydroxides and metal salts of weak acids, and cationic complexes and chelates thereof;

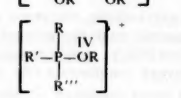
IV. 0.5–15 parts by weight of curing agent; and

V. 0.05–5 parts by weight of at least one curing accelerator, said curable compositions being characterized in that the curing agent is selected from the group consisting of hydroquinone, resorcinol, catechol, naphthols, bisphe-

nols, their derivatives containing substances other than hydrogen in the aromatic ring, the aliphatic group, or both; aliphatic and cycloaliphatic diols; dialkylene aromatic diols, the corresponding thiol derivatives and alkali metal salts thereof; and in that the curing accelerator, used in combination therewith is a hydrate or salt of the cations:

A)  (N-alkoxy ammonium)

B)  (alkylene N, N′ dialkoxy ammonium)

C)  (P-alkoxy phosphonium)

wherein R′, R″ and R‴ which may be the same or different are selected from the group consisting of alkyl, cycloalkyl, aryl, alkylenaryl, oxyalkyl, and polyoxyalkyl groups with the OH end group either free or etherified, containing from 1 to 18 carbon atoms; —CH=groups which are part of aromatic or heteroaromatic rings; —CH= groups which are part of cycloaliphatic or heterocycloaliphatic rings; and $—CH_2$ groups which are part of cycloaliphatic or heterocycloaliphatic rings; R″′ is selected from the group consisting of hydrogen, alkyl, oxyalkyl and polyoxyalkyl groups in which the —OH end group is either free or etherified; and wherein R is selected from the group consisting of alkylene, cycloalkylene and dialkylene cycloalkyl groups containing from 2 to 18 carbon atoms and dialkylarylene groups containing from 8 to 12 carbon atoms, with organic and inorganic anions.

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**3,920,621**

## PROCESS FOR THE PRODUCTION OF HIGH-MOLECULAR LOW-PRESSURE CO- AND TERPOLYMERS OF ETHYLENE OF LOW DENSITY

**Fritz Baxmann; Albert Frese; Johann Dietrich, and Otto Hahmann, all of Marl, Germany, assignors to Chemische Werke Huels, Aktiengesellschaft, Marl, Germany**

**Filed Feb. 12, 1973, Ser. No. 332,035**

**Claims priority, application Germany, Feb. 11, 1972, 2206429; Mar. 24, 1972, 2214271**

**Int. Cl.² C08F** *210/08, 210/16*

**U.S. Cl. 260—80.78** **16 Claims**

**1.** In a process for the production of low density thermoplastic ethylene copolymers by a low pressure copolymerization of ethylene with an α-olefin comonomer selected from the group consisting of propylene, butene-1 and mixtures thereof, which comprises the combination of employing a particulate mixed polymerization catalyst consisting essentially of (a) titanium trichloride or a halogenated orthotitanic acid dialkyl ester and (b) ethylaluminum sesquichloride in a molar ratio Al:Ti of 0.5–5.0, the improvemenet which comprises conducting the polymerization as a liquid phase solution polymerization employing a polymerization solvent consisting essentially of $C_4$ or a mixture of $C_3$ and $C_4$ hydrocarbons containing at least 10 molar percent of butene-2.

**3,920,622**

## POLYMERS COMPRISING VINYL AROMATIC. $C_2$ TO $C_8$ OLEFIN ARE USEFUL AS LUBRICANT ADDITIVES

**Won R. Song, Maplewood, and Norman Jacobson, East Brunswick, both of N.J., assignors to Exxon Research & Engineering Co., Linden, N.J.**

**Division of Ser. No. 267,211, June 28, 1972, Pat. No. 3,790,483. This application Dec. 3, 1973, Ser. No. 421,413**

**Int. Cl.² C08F** *210/00, 212/00*

**U.S. Cl. 260—80.78** **2 Claims**

**1.** V.I. improving and pour depressing oil soluble, substantially amorphous terpolymer having a degree of crystallinity of less than 25 %, an intrinsic viscosity of about 0.24 to about 0.35 when measured at 210°F in a solvent extracted neutral mineral lubricating oil having a viscosity of about 6.2 cs. at 210°F, consisting of 5 to 45 mole percent of styrene, about 5 to 40 mole percent of a lower straight chain alpha-olefin selected from the group consisting of ethylene, propylene, butene-1, pentene-1 and hexene-1, and 20 to 80 mole percent of a $C_{12}$ to $C_{20}$ substantially linear alpha-olefin having not less than nine unsubstituted methylene radicals in a straight chain following the olefinic carbon atoms, said terpolymer being prepared by a Ziegler-Natta synthesis.

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**3,920,623**

## TREATMENT OF CHLOROPRENE-SULFUR COPOLYMERS WITH BENZOTHIAZOLE SULFENAMIDES

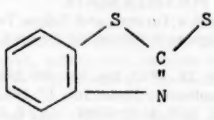
**Ausat Ali Khan, Newark, Del., assignor to E. I. Du Pont de Nemours & Company, Wilmington, Del.**

**Continuation-in-part of Ser. No. 227,660, Feb. 18, 1972, abandoned. This application May 25, 1973, Ser. No. 363,806**

**Int. Cl.² C08D** *5/02, 3/14, 1/38*

**U.S. Cl. 260—92.3** **16 Claims**

**1.** In a process for making chloroprene-sulfur copolymers which comprises polymerizing chloroprene in an alkaline aqueous emulsion in the presence of elemental sulfur and a free radical polymerization catalyst to form a chloroprene polymer latex, the improvement which comprises incorporating into the system at a time no later than when the polymer is in the latex state at least about 0.5 part by weight per hundred parts organic monomer of a sulfenamide compound having the structure



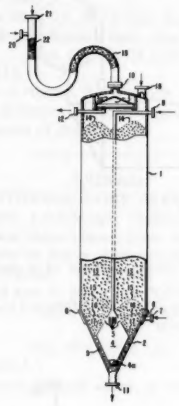
where R and R′ are independently alkyl, cycloalkyl, aralkyl radicals or one of R or R′ is hydrogen, or R and R′ together form a morpholine or saturated ring containing only carbon and hydrogen in addition to the nitrogen, and after polymerization and subsequent to the addition of the sulfenamide or at the same time thereof, separately adding to the polymer at least about 0.1 part by weight per hundred parts organic monomer of at least one peptizing agent from the group of dialkyl xanthogen disulfides, water-soluble salts of alkyl xanthic acids, and water-soluble salts of dialkyl dithiocarbamic acids.

3,920,624

## PROCESS FOR STRIPPING RESIDUAL SOLVENT FROM POLYMER PELLETS AND APPARATUS

Robert Garnett Humkey, Wilmington, Del., and Donald James Ryan, Port Neches, Tex., assignors to E. I. du Pont de Nemours & Co., Wilmington, Del.

Filed Jan. 14, 1974, Ser. No. 433,378
Int. Cl.[2] C08F 6/00
U.S. Cl. 260—94.9 F 8 Claims



1. a continuous process for stripping residual volatiles from solid pellets which comprises

a. continuously feeding pellets as a falling ring to the top of a gravity-driven, downwardly moving cylindrical bed of pellets maintained in a condition substantially of plug-flow, said pellets in the bed being immersed in a gaseous medium and wet with a surface film of water, said falling ring having a diameter of approximately one-half the diameter of the cylindrical bed;

b. continuously passing a stripping gas comprising steam into the base of said downwardly moving bed of pellets and up through the moving bed of pellets in a direction counter-current to the direction of flow of said bed of solid pellets wet with films of water;

c. continuously removing pellets from the base of the cylindrical moving bed into an inverted conical reducing section of the bed leading to an axially centered discharge point, while deflecting pellets from the center of the base section of the cylindrical bed towards the wall of the conical section and deflecting pellets from the circumference of the base section of the cylindrical bed toward the axis of the column, at the same rate as pellets are added to the top of the bed, said rate being adjusted to provide a hold-up residence time of pellets in the moving bed, relative to the half-life of volatiles in the pellets, sufficient to reduce the concentration of volatiles in the pellets to a predetermined level; and

d. passing the stripping gas, containing the volatiles removed from the pellets, from a vapor space above the moving bed to a condenser and separator and removing the condensed, separated volatiles therefrom.

3,920,625

## ISOLATION OF COAGULATION FACTORS FROM BIOLOGICAL MATERIAL USING CROSS LINKED SULFATED, SULFONATED CARBOHYDRATES

Lars-Olov Andersson, Knivsta; Håkan Gunnar Borg, Huddinge; Nanna Forsman; Gunnar Hanshoff, both of Jarfalla; Göran Lindroos, Stockholm; Maggie Miller-Andersson, Jarfalla, and Elisabeth Charlotte Ehrenberg, Dalby, all of Sweden, assignors to AB Kabi, Stockholm, Sweden

Filed June 19, 1973, Ser. No. 371,491
Int. Cl.[2] C07G 7/00
U.S. Cl. 260—112 B 1 Claim

1. The method of isolating the blood coagulation factors fibrinogen, the antihemophilia factor, and B-factor from blood plasma, which comprises

admixing liquid plasma with 8 percent ethanol to precipitate the Cohn (method 6) fraction I, and subjecting the resulting mixture to centrifugation;

separating the thus settled Cohn (method 6) fraction I, cutting it into pieces and dissolving it in citrate buffer in the ratio of the amount of fraction I precipitate derived from 30 kilos of starting plasma to 9.6 liters of 0.02M citrate buffer providing pH 6.8,

admixing the resulting solution and 180 milliliters of 2 percent aluminum hydroxide gel, and after stirring the mixture, removing the gel by centrifugation;

removing the supernatant from this centrifugation of the aluminum hydroxide gel mixture and admixing it with 10 liters of cyanogen bromide cross-linked dextran sulfate-agarose gel and after stirring the resulting mixture filtering it,

admixing the filtrate with the foregoing 0.02M citrate buffer thereby precipitating the antihemophilia factor;

then eluting the cyanogen bromide cross-linked dextran sulfate -agarose gel residue of this filtration with 2M sodium chloride solution thereby to remove the thereon adsorbed fibrinogen;

admixing 5 liters of swollen epichlorohydrin cross-linked diethylaminoethyl dextran beads with 32 liters of the supernatant from the Cohn (method 6) fraction I precipitate, stirring the resulting mixture and separating these beads by decanting off the liquid phase;

eluting the adsorbate from the separated beads with 0.05M phosphate and 1M sodium chloride buffer which provides a pH of 7,

dialyzing the eluate against 0.03M citrate and 0.06M sodium chloride buffer that provides pH 7.6,

admixing the dialysate with 1 liter of cyanogen bromide cross -linked heparin-agarose gel with stirring,

eluting that dialysate-wetted gel by gradient elution with 0.05M citrate buffer that provides pH 5.0, by regularly increasing the ionic strength of that buffer by adding 2M sodium chloride; and

dialyzing that eluate against distilled water, thereby leaving the dialysis residue as the B-factor product.

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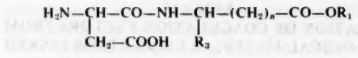
3,920,626

## NOVEL ASPARTYL DIPEPTIDE ESTERS AS SWEETENERS

Yasuo Ariyoshi, Yokohama; Naohiko Yasuda, and Tetsuo Yamatani, both of Kawasaki, all of Japan, assignors to Ajinomoto Co., Inc., Tokyo, Japan

Filed May 16, 1973, Ser. No. 360,671
Claims priority, application Japan, June 1, 1972, 47-54565
Int. Cl.[2] C07C 103/52; A23L 1/22
U.S. Cl. 260—112.5 6 Claims

1. An α-N-aspartyl-amino acid ester of the formula



wherein $R_1$ is alkyl having 1 to 4 carbon atoms, $R_3$ is hydrogen or methyl, $n$ is 1 or 2, said aspartyl is in the L-configuration or the DL-configuration, and said amino acid is in the D-configuration or the DL-configuration when $R_3$ is methyl.

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**3,920,627**

## POSITION 1 ANALOGS OF [PHENYLGLYCYL]$^8$-ANGIOTENSION II

**Hans Wissmann, Bad Soden, Taunus; Rolf Geiger; Ernst Lindner, both of Frankfurt am Main, and Bernward Schölkens, Bad Soden, Taunus, all of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany**

**Filed May 7, 1974, Ser. No. 467,832**

**Claims priority, application Germany, May 9, 1973, 2323322**

**Int. Cl.$^2$ C07C** *103/52;* **A61K** *37/26*

**U.S. Cl. 260—112.5** **8 Claims**

**1.** A peptide of the formula

X-Arg-Val-Tyr-Ile-His-Pro-Phegly-OH

wherein X is phthalyl or the radical of an aliphatic carboxylic acid having up to 5 carbon atoms which may be mono-substituted by —COOH, —$CONH_2$, —$NH_2$, or —$NHCH_3$ or di-substituted by —$NH_2$ and —$CONH_2$ or by —$NH_2$ and —COOH, and Phegly—OH is L-C-phenyl glycine.

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**3,920,628**

## 2''-DEOXYAMINOGLYCOSIDES AND 2''-EPI-AMINO-3''-DESAMINO DERIVATIVES THEREOF, METHODS FOR THEIR MANUFACTURE AND NOVEL INTERMEDIATES USEFUL THEREIN

**Peter J. L. Daniels, Cedar Grove, N.J., assignor to Schering Corporation, Kenilworth, N.J.**

**Filed Oct. 24, 1972, Ser. No. 300,083**

**Int. Cl.$^2$ C07H** *15/22*

**U.S. Cl. 260—210 AB** **36 Claims**

**1.** A compound selected from the group consisting of a 2''-deoxyaminoglycoside selected from the group consisting of 2''-deoxygentamicin A, 2''-deoxygentamicin B, 2''-deoxygentamicin $B_1$, 2-deoxygentamicin $C_1$, 2''-deoxygentamicin $C_{1a}$, 2''-deoxygentamicin $C_2$, 2''-deoxygentamicin $C_{2a}$, 2''-deoxygentamicin $X_2$, 2''-deoxysisomicin, 2''-deoxyverdamicin, 2''-deoxy-Antibiotic JI-20-A, 2''-deoxy-Antibiotic JI-20-B, 2''-deoxy-Antibiotic G-418, 2''-deoxytobramycin and 3',4',2''-trideoxykanamycin B; the 3''-desmethylamino-2''-epi-methylamino- or 3''-desamino-2''-epi-amino derivatives thereof; mixtures of said 2''-deoxyaminoglycoside with the 3''-desmethylamino-2''-epi-methylamino analog thereof or with the 3-desamino-2''-epi-amino analog thereof; and the non-toxic pharmaceutically acceptable acid addition salts of the foregoing.

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**3,920,629**

## DESEVERNITROSE EVERNINOMICINS AND METHOD FOR THEIR MANUFACTURE

**Ashit K. Ganguly, Upper Montclair; Olga Sarre, Verona, and Sol Szmulewicz, Hazlet, all of N.J., assignors to Schering Corporation, Kenilworth, N.J.**

**Continuation-in-part of Ser. No. 398,609, Sept. 19, 1973, abandoned. This application Sept. 30, 1974, Ser. No. 510,837**

**Int. Cl.$^2$ C07C** *15/00*

**U.S. Cl. 260—210 AB** **13 Claims**

**1.** A compound selected from the group consisting of desevernitrose everninomicin B, desevernitrose everninomicin C, desevernitrose everninomicin D, and pharmaceutically acceptable phenolic mono-cationic salts and N-methyl glucamine acid addition salts of the foregoing.

**3,920,630**

## 2,2'-ANHYDRO-ARA-CYTIDINE COMPOUNDS AND PROCESS OF PREPARATION

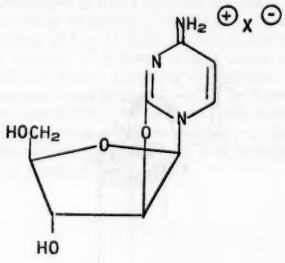
**William J. Wechter, and Duane T. Gish, both of Kalamazoo, Mich., assignors to The Upjohn Company, Kalamazoo, Mich.**

**Division of Ser. No. 75,272, Sept. 24, 1970, abandoned. This application Sept. 5, 1972, Ser. No. 286,170**

**Int. Cl.$^2$ C07H** *19/06*

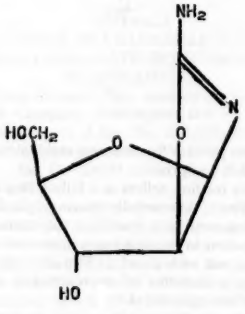
**U.S. Cl. 260—211.5 R** **4 Claims**

**1.** A process for the production of a compound of the formula

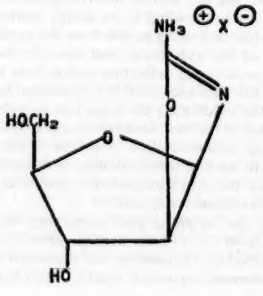


wherein $X^{\ominus}$ is the conjugate base of a strong acid, which comprises the steps of

1. mixing 2-amino-β-D-arabinofurano-[1',2':4,5]-2-oxazoline of the formula



with a strong acid whose conjugate base is the same as that of the compound of Formula I, above, to yield a corresponding compound of the formula



wherein $X^{\ominus}$ has the same meaning as above;

2. heating a thus produced compound resulting from step (1) with cyanoacetylene to yield a corresponding compound of Formula I, above.

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3,920,631

## VITAMIN $B_{12}$ DERIVATIVES HAVING PROLONGED ACTIVITY

**Luigi Molteni, Milan; Eraldo Antonini, Rome, and Emilio Oradi, Bergamo, all of Italy, assignors to Dr. L. Zambeletti S.p.A., Milan, Italy**

**Filed Mar. 25, 1974, Ser. No. 454,250**

**Claims priority, application Italy, Apr. 4, 1973, 22596/73**

**Int. Cl.² C07H** *1/00*

**U.S. Cl. 260—211.7** **5 Claims**

1. An analog of vitamin $B_{12}$ in which cobamamide is covalently linked to dextran via the amido group of the former and the hydroxyl groups of the latter.

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3,920,632

## ANTHRAQUINONE DYESTUFFS

**Walter Hohmann, Leverkusen; Helmut Herzog, Bergisch-Neukirchen, and Hans-Samuel Bien, Burscheid, all of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen-Bayerwerk, Germany**

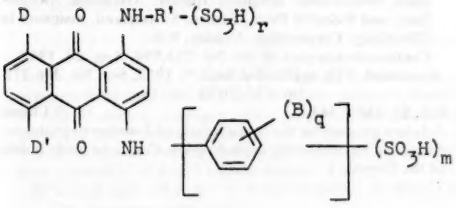
**Filed Jan. 3, 1973, Ser. No. 320,721**

**Claims priority, application Germany, Jan. 3, 1972, 2200107**

**Int. Cl.² C09B** *1/34*

**U.S. Cl. 260—239.3 T** **1 Claim**

1. Anthraquinone dyestuff which, in the free acid form, has the formula



wherein

R′ is $C_1$-$C_{12}$-alkyl; $C_1C_{12}$-alkyl substituted by cyano, hydroxy, nitro, halogen, $C_1$-$C_4$-alkoxy, $C_1$-$C_4$-alkoxy carbonyl, $C_1$-$C_4$-alkoxycarbonyloxy, $C_1$-$C_4$-alkylcarbonyloxy, $C_1$-$C_4$-alkylcarbonylamino, $C_1$-$C_4$-alkylsulfonyl, $C_1$-$C_4$-alkylaminocarbonyloxy, $C_1$-$C_4$-alkylaminocarbonylamino, $C_1$-$C_4$-alkylaminothiocarbonylamino, $C_1$-$C_4$-alkylaminosulfonyloxy, phenoxy, amino, mono-$C_1$-$C_4$-alkylamino, di-$C_1$-$C_4$-alkylamino, benzoyloxy or $C_1$-$C_4$-alkylmercapto; phenyl-$C_1$-$C_4$-alkyl; cyclohexyl; or cyclohexyl substituted by $C_1$-$C_4$-alkyl, benzyl, phenoxy, $C_1$-$C_4$-alkoxy, amino or $C_1$-$C_4$-alkyl amino;

D and D′ are nitro or hydrogen, but cannot simultaneously have the same meaning;

B is $C_1$-$C_4$-alkyl; $C_1$-$C_4$-alkoxy; $C_1$-$C_4$-alkylmercapto; $C_1$-$C_4$-alkylsulfonyl; fluoro; chloro; bromo; amino; phenylsulfonyl; phenylmercapto; phenoxy; phenyl-$C_1$-$C_4$-alkylaminosulfonyl; phthalimido-N-methyl; or caprolactam-N-methyl;

*q* is a number from 0 to 4; and

*r* and *m* are numbers from 0 to 3 and (r+m) = 1 to 4.

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3,920,633

## NEW 6-AZA-1,4 -BENZODIAZEPINE

**Walter vonBebenburg, Buchschlag, and Heribert Offermanns, Grossauheim, both of Germany, assignors to Deutsche Gold- und Silber-Scheideanstalt vormals Roessler, Germany**

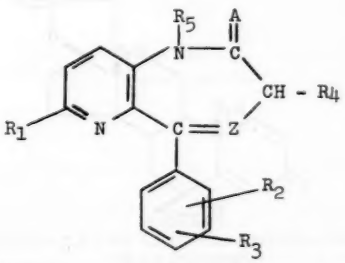
**Filed Apr. 22, 1974, Ser. No. 463,130**

**Claims priority, application Austria, May 8, 1973, 4029/73**

**Int. Cl.² C07D** *471/04*

**U.S. Cl. 260—239.3 B** **10 Claims**

1. A 6-aza-1H-1,4-benzodiazepine or 6-aza-1,2-dihydro-3H-1,4-benzodiazepine of the formula:



wherein:

$R_1$ is a halogen;

$R_2$ and $R_3$ are hydrogen, halogen, trifluoromethyl, nitro, nitrile, alkyl of 1 to 6 carbon atoms or alkoxy of 1 to 6 carbon atoms;

$R_4$ is hydrogen, hydroxy, alkyl of 1 to 6 carbon atoms; or alkoxy of 1 to 6 carbon atoms;

Z is nitrogen or the group ≡ NO;

$R_5$ is carbamoyl, thiocarbamoyl or carbamoyl or thiocarbamoyl substituted with (1) alkyl of 1 to 6 carbon atoms, (2) alkenyl of 2 to 6 carbon atoms, or (3) cycloalkyl of 3 to 6 carbon atoms; and

A is oxygen and pharmaceutically acceptable salts thereof.

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3,920,634

## 2,3-DIHYDROESTRA-1,3,5(10)-TRIENO (16α,17α-β) FURAN-17β OLS

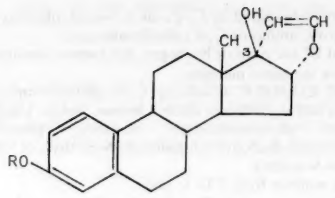
**Alan Dinner, Indianapolis, Ind., assignor to Eli Lilly and Company, Indianapolis, Ind.**

**Filed Aug. 30, 1974, Ser. No. 502,131**

**Int. Cl.² C07J** *17/00*

**U.S. Cl. 260—239.55 R** **5 Claims**

1. The compound of the formula



wherein:

R is hydrogen, ($C_1$-$C_3$) alkyl, or ($C_5$-$C_6$) cycloalkyl.

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**3,920,635**

**(6S)-17′-HYDROXY-3′-OXOSPIRO[OXIRANE-2,6′-[17α]PREGN[4]ENE]-21′-CARBOXYLIC ACID γ-LACTONE, THE $\Delta^{1,4}$ ANALOG, AND INTERMEDIATES**

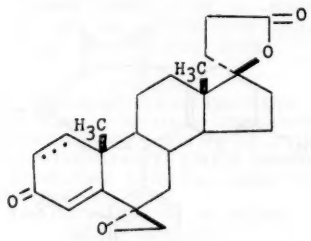
**Leonard N. Nysted, Highland Park, Ill., assignor to G. D. Searle & Co., Chicago, Ill.**

**Filed Nov. 27, 1974, Ser. No. 527,523**

**Int. Cl.² C07J** *19/00*

**U.S. Cl. 260—239.57** **8 Claims**

1. A compound of the formula



wherein the endocyclic dotted line denotes optional $\Delta^1$ unsaturation.

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**3,920,636**

**QUINAZOLINE COMPOUNDS**

**Tohru Takahashi, Tokyo, and Hachiro Sugimoto, Noda, both of Japan, assignors to Eisai Co., Ltd., Tokyo, Japan**

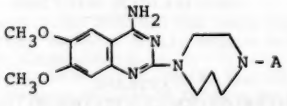
**Filed Oct. 29, 1973, Ser. No. 410,351**

**Claims priority, application Japan, Oct. 30, 1972, 47-107879; Oct. 30, 1972, 47-107880**

**Int. Cl.² C07D** *403/04, 405/14*

**U.S. Cl. 260—240 J** **4 Claims**

1. A compound selected from the group consisting of 2-(4′-substituted homopiperazino)-4-amino-6,7-dimethoxyquinazolines having the formula:



wherein A is selected from the group consisting of (i) and (ii), wherein

(i) is $R^1$—CO—, wherein $R^1$ is alkyl of $C_1$–$C_4$; phenyl substituted with halogen, methoxy or methanesulfonyl; unsubstituted styryl or styryl ring substituted with halogen, methoxy or 3,4-methylenedioxy; or 2-furyl, and

(ii) is $R^2$—, wherein $R^2$ is alkyl of $C_1$–$C_4$; benzyl substituted with halogen or methoxy; or β-(2-pyridyl)ethyl, and pharmacologically acceptable acid-addition salts thereof.

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**3,920,637**

**CHEMICAL COMPOUNDS AND PROCESSES**

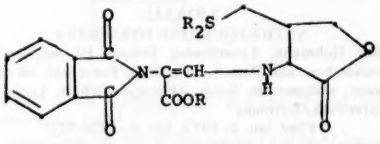
**Narindar N. Girotra, Fords, and Norman L. Wendler, Summit, both of N.J., assignors to Merck & Co., Inc., Rahway, N.J.**

**Continuation-in-part of Ser. No. 274,388, July 24, 1972, abandoned. This application Apr. 24, 1974, Ser. No. 463,623**

**Int. Cl.² C07D** *405/12*

**U.S. Cl. 260—240 R** **14 Claims**

1. The process which comprises reacting γ,γ′-dihydroxyvaline lactone with a lower alkyl α-phthalimidomalonaldehydate to produce the corresponding ester of dihydro-3-[(2-carboxy-2-phthalimidovinyl)amino]-4-(hydroxymethyl)-2(3H)-furanone, treating this compound with an alkyl, aralkyl or monocyclic aryl sulfonyl halide to obtain the corresponding arylsulfonate, and reacting this compound with a thioalkanoic or thioaromatic acid salt to produce a compound of the formula:



wherein R is lower alkyl and $R_2$ is lower alkanoyl.

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**3,920,638**

**PROCESS FOR PREPARATION OF 7-AMINO-CEPHALOSPORANIC ACID COMPOUND**

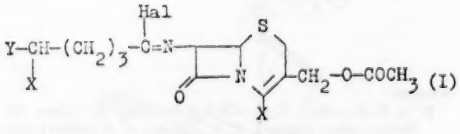
**Hans Bickel, Binningen, Switzerland; Rolf Bosshardt, deceased, late of Arlesheim, Switzerland (by Ruth Elisabeth Bosshardt-Schär, legal representative); Bruno Fechtig, Reinach, Switzerland; Johannes Mueller, Arlesheim, Switzerland, and Heinrich Peter, Riehen, Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.**

**Continuation-in-part of Ser. No. 753,894, Aug. 20, 1968, abandoned. This application Sept. 7, 1973, Ser. No. 396,272**

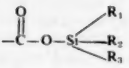
**Int. Cl.² C07D** *501/18*

**U.S. Cl. 260—243 C** **9 Claims**

1. In a process for the manufacture of 7-amino-cephalosporanic acid by converting cephalosporin C into an imide halide of the formula I



wherein Y represents a protected amino group, X is an esterified carboxyl group of the formula



in which each of $R_1$, $R_2$ and $R_3$ is a member selected from the group consisting of lower alkyl, phenyl, phenyl-lower alkyl, and cycloalkyl having 5-7 carbon atoms, and Hal is halogen, converting the imide halide into a corresponding imino-ether by means of an alcohol of the formula ROH wherein R is selected from the group consisting of lower alkyl, lower alkyl substituted by halogen, and phenyl-lower alkyl, splitting the double bond of the imino-ether under acid conditions with a compound selected from the group consisting of water and a hydroxyl containing compound and removing the ester group, the improvement wherein the imide-halide is reacted with the alcohol ROH at a temperature between −15° and + 30°C.

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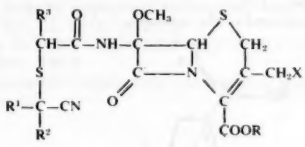
## 3,920,639
## CYANOMETHYLTHIOACETYL-7-METHOXYCEPHALOSPORINS

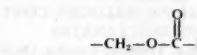
**Joseph Edward Dolfini, Princeton, N.J., assignor to E. R. Squibb & Sons, Inc., Princeton, N.J.**

**Filed Apr. 23, 1973, Ser. No. 353,273**
**Int. Cl.² C07D** *501/28, 501/36, 501/40;* **A61K** *31/545*
**U.S. Cl. 260—243 C** **11 Claims**

1. A compound of the formula



wherein R is hydrogen, alkyl of 1 to 3 carbon atoms, haloalkyl of 1 to 3 carbons, benzyl, phenethyl, benzhydryl, trialkylsilyl wherein the alkyl has 1 to 4 carbon atoms, a salt forming ion selected from the group consisting of aluminum, alkali metal, alkaline earth metal, methylamine, ethylamine, dimethylamine, triethylamine, dibenzylamine or



wherein $R^4$ is alkyl of 1 to 5 carbon atoms, phenyl or benzyl; $R^1$ and $R^2$ each is hydrogen, alkyl of 1 to 5 carbon atoms, alkenyl of 2 to 5 carbon atoms, phenyl, benzyl or phenethyl of $R^1$ and $R^2$ together with the carbon to which they are attached form cycloalkyl of 4 to 7 carbon atoms;

$R^3$ is hydrogen, alkyl of 1 to 5 carbon atoms, or alkenyl of 2 to 5 carbon atoms; and

X is hydrogen, acetoxy, carbamoyloxy, pyridinium, pyridyl-1-oxo2-thio, 3-methyl-1,2,4-thiadiazolylthio, 1-methyl-tetrazolyl-5-thio or 2-methyl-1,3,4-thiadiazolyl-5-thio.

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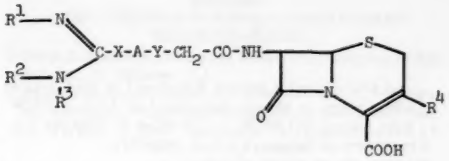
## 3,920,640
## ACYLAMINO-CEPHEM-CARBOXYLIC ACIDS AND PROCESS FOR PREPARING THEM

**Manfred Schorr, Frankfurt am Main; Manfred Worm, Mainz, and Elmar Schrinner, Wiesbaden, all of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany**

**Filed May 2, 1973, Ser. No. 356,466**
**Claims priority, application Germany, May 5, 1972, 2222140; Apr. 3, 1973, 2316541**
**Int. Cl.² C07D** *501/24*
**U.S. Cl. 260—243 C** **19 Claims**

1. An acylamino-cephem-carboxylic acid of the formula



and physiologically tolerated salts thereof, wherein $R^1$, $R^2$, and $R^3$, taken alone, are hydrogen or lower alkyl; $R^1$ and $R^2$, taken together, are alkylene having 2 to 4 carbon atoms, alkylene having from 2 to 4 carbon atoms substituted with lower alkyl or lower alkoxy alkyl, or alkylene having from 2 to 4 carbon atoms substituted on one carbon atom thereof with lower alkylene or lower oxa-alkylene to form a spiro-connected 5- or 6-membered carbocycle or oxygen heterocycle therewith; $R^4$ is linear or branched alkyl having 1 to 5 carbon atoms, cycloalkyl having 3 to 7 carbon atoms, tetrahydrofuranyl, or tetrahydrothienyl; X is NH or a single bond; A is phenylene, thienylene, or phenylene or thienylene substituted by lower alkyl, lower alkoxy, or chlorine; and Y is oxygen or a single bond.

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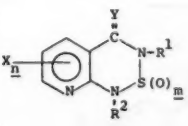
## 3,920,641
## 1H-PYRIDO(2,3-C OR 4,3-C) (1,2,6)THIADIAZIN-4(3H)-NE-2,2-DIOXIDES

**Lennon H. McKendry, Midland, Mich., assignor to The Dow Chemical Company, Midland, Mich.**

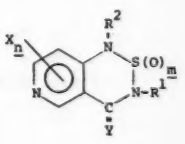
**Filed Nov. 5, 1973, Ser. No. 412,944**
**Int. Cl.² C07D** *285/16*
**U.S. Cl. 260—243 R** **25 Claims**

1. A compound of the formulae:



(I)

or



(II)

wherein:

each X independently represents loweralkyl of 1 to 6 carbon atoms, haloloweralkyl of 1 to 6 carbon atoms, cycloalkyl of 3 to 6 carbon atoms, $-SO_2R^5$, $-SO_2$aryl wherein aryl is phenyl, halophenyl or tolyl, $Y'R^5$, $CCl_3$, $CF_3$, SCN,

aryl wherein aryl is phenyl, halophenyl or tolyl, aryloxy wherein aryl is phenyl, halophenyl or tolyl, $-NR^3R^4$, halo, nitro, $-SO_2NR^3R^4$, $-COOR^5$ or $Y''CF_2CZ_3$;

*n* represents an integer of 0 to 3, inclusive;

*m* represents an integer of 1 or 2;

each Y, Y′ and Y″ independently represent a chalcogen group having an atomic number of from 8 to 16, inclusive;

$R^1$ and $R^2$ each independently represent hydrogen, loweralkyl of 1 to 6 carbon atoms, halololoweralkyl of 1 to 6 carbon atoms, alkenyl of 3 to 6 carbon atoms, haloalkenyl of 3 to 6 carbon atoms, alkynyl of 3 to 6 carbon atoms, haloalkynyl of 3 to 6 carbon atoms, cycloalkyl of 3 to 6 carbon atoms, aryl wherein aryl is phenyl, halophenyl or tolyl, benzyl, benzoyl, benzenesulfonyl, loweralkoxyalkyl wherein each of alkoxy and alkyl are from 1–6 carbon atoms, $Y'R^5$, $-SCCl_3$, **8n**

$NH_2$, $-SO_2R^5$,

dialkylaminoalkyl wherein each alkyl is of from 1 to 6 carbon atoms, pyrrolidinoethyl, piperidinoethyl, morpholinoethyl,

or $-C(CH_3)_2C \equiv N$;

each $R^3$ and $R^4$ independently represent hydrogen or loweralkyl of 1 to 6 carbon atoms;

each $R^5$ represents loweralkyl of 1 to 6 carbon atoms;

each Z independently represents hydrogen, bromo, chloro or fluoro; and

where at least one of $R^1$ and $R^2$ is hydrogen, the salts thereof with organic or inorganic bases.

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**3,920,642**

**OXAZINIUM SALTS**

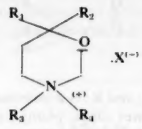
**Nathaniel Grier, Englewood, N.J., assignor to Merck & Co., Inc., Rahway, N.J.**

**Continuation-in-part of Ser. No. 71,408, Sept. 11, 1970, abandoned. This application June 25, 1973, Ser. No. 373,063**

**Int. Cl.[2] C07D** *265/06*; **C07H** *19/02*

**U.S. Cl. 260—244 R** **6 Claims**

**1.** A compound of the formula:



wherein $R_1$ is benzyl, phenyl or phenyl substituted by one loweralkyl, halo, loweralkoxy or nitro group, $R_2$ is loweralkyl or phenyl, $R_3$ is loweralkyl, $R_4$ is an alkyl group having 8–12 carbon atoms, and X is an anionic radical from the group consisting of halogen, an alkyl sulfate containing from 1–18 carbon atoms and saccharinate.

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**3,920,643**

**INTERMEDIATES FOR PRODUCING PROSTAGLANDINS**

**George E. Just, Westmount, Canada, and Chaim Simonovitch, Rishon-Le-Zion, Israel, assignors to George E. Just, Westmount, Canada**

**Continuation of Ser. No. 103,334, Dec. 13, 1970, abandoned, which is a continuation-in-part of Ser. No. 657,085, July 31, 1967, abandoned. This application Aug. 17, 1972, Ser. No. 281,341**

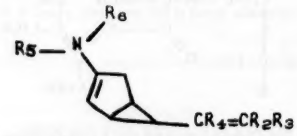
**Claims priority, application United Kingdom, Aug. 9, 1966, 35550/66; Jan. 24, 1967, 3588/67**

*Disclosure was also published under Trial Voluntary Protest Program on Jan. 28, 1975.*

**Int. Cl.[2] C07D** *295/02*

**U.S. Cl. 260—247** **2 Claims**

**1.** A compound of the formula:



wherein $R_2$ is alkyl of 4 to 8 carbon atoms, inclusive, wherein $R_3$ and $R_4$ are hydrogen or methyl, and wherein $R_5$ and $R_6$ together with the nitrogen form morpholino.

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**3,920,644**

**PROCESS FOR PREPARING HALOGEN-CONTAINING ORGANIC ISOCYANATES**

**Susumu Handa, Wakayama; Yoshiaki Tanaka, Osaka; Atsushi Nishibata, and Yoshiaki Inamoto, both of Wakayama, all of Japan, assignors to Kao Soap Co., Ltd., Tokyo, Japan**

**Filed July 12, 1974, Ser. No. 487,899**

**Claims priority, application Japan, July 17, 1973, 48-81533**

**Int. Cl.[2] C07C** *118/00*; **C07D** *251/04*

**U.S. Cl. 260—248 NS** **8 Claims**

**1.** A process for preparing halogen-containing organic isocyanates, which comprises: reacting at 60° to 190°C,

A. a benzyl chloride derivative or a mixture of benzyl chloride derivatives having a nucleus-substituted substituent located ortho to the chloromethyl group, said substituent having a steric interaction with the chloromethyl group and having a halogen content of at least 80 percent by weight, provided that said substituent is not a fluorine atom, the remaining carbon atoms of the nucleus being unsubstituted or substituted by halogen, methylmonohalides, methyldihalides, methyltrihalides, vinyldibromide, or phenyl,

B. an alkali metal cyanate selected from the group consisting of lithium cyanate, sodium cyanate, potassium cyanate and mixtures thereof, the amount of B being in the range of from 0.5 to 2.5 moles per mole of chlorine atom of the chloromethyl group or groups of A, in the presence of

C. at least a catalytically effective amount of an amine compound or mixture of amine compounds having a structure such that it does not cause substitution with the chlorine atom

of the chloromethyl group or groups of A, said amine compound being selected from the group consisting of diphenylamine, N-cyclohexylaniline, triphenylamine, trimethylamine, triethylamine, tripropylamine, tributylamine, dimethylaniline, diethylaniline, pyridine, picoline, corydine, quinoline, N-methylmorpholine, N-ethylmorpholine, N-phenylmorpholine, triethylene diamine, N-methylpiperidine, N-ethylpiperidine, N-ethylpiperidine, N-phenylpiperidine, N,N′-dimethylpiperazine, N,N′-diethylpiperazine, dimethyl formamide, diethyl formamide, dimethyl acetamide, tetramethylurea, N-methylpyrrolidone, formylmorpholine, acetylmorpholine, formylpiperidine, acetylpiperidine, N-methyl phthalimide, and quaternary ammonium salts formed from the foregoing amines, until a halogen-containing organic isocyanate is formed, and recovering from the reaction mixture said halogen-containing organic isocyanate.

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**3,920,645**

## CARBAMIDE-FORMALDEHYDE CONDENSATION PRODUCTS

**Luzius Schibler, Riehen, and Jurg Merz, Therwil, both of Switzerland, assignors to Ciba-Geigy AG, Basel, Switzerland**

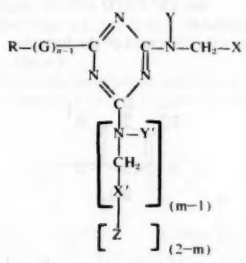
**Filed Mar. 26, 1973, Ser. No. 344,671**

**Claims priority, application Switzerland, Mar. 28, 1972, 4632/72; Dec. 22, 1972, 18727/72**

**Int. Cl.² C07D** *251/42, 251/50, 251/70, 251/48*

**U.S. Cl. 260—249.5** **8 Claims**

1. A carbamide-formaldehyde condensation product, having the formula



wherein R is alkyl or alkenyl with six to 22 carbon atoms, cycloalkyl with five or six ring carbon atoms, alkylphenyl with one to 12 carbon atoms in the alkyl part, phenyl or benzyl; G is oxygen or

wherein A is hydrogen or alkyl with one to four carbon atoms; Z is halogen or

Y, Y′, Y″ and Y‴ each represent hydrogen, $-CH_2-O-Q$, wherein Q is hydrogen or alkyl with one to four carbon atoms, or $-CH_2-X''$; X, X′ and X″ each represent a monoalkylene glycol or polyalkylene glycol radical bonded via an oxygen atom and having an average molecular weight of at most 2,000 and two to four carbon atoms per alkylene unit; and *n* and *m* each is 1 or 2.

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**3,920,646**

## 3-SUBSTITUTED-1-PYRIDYL-1,4,5,6-TETRAHYDROPYRIDAZINES

**William J. Houlihan, Mountain Lakes, N.J., assignor to Sandoz, Inc., E. Hanover, N.J.**

**Continuation-in-part of Ser. No. 680,002, Nov. 2, 1967, Pat. No. 3,586,681, which is a continuation-in-part of Ser. No. 566,719, July 21, 1966, abandoned. This application Jan. 13, 1971, Ser. No. 106,249**

**Int. Cl.² C07D** *241/02*

**U.S. Cl. 260—250 A** **2 Claims**

1. The compound which is 3-(p-chlorophenyl)-1-(α-pyridyl)-1,4,5,6-tetrahydropyridazine.

2. The compound which is 6-(p-chlorophenyl)-2-(α-pyridyl)-4,5-dihydro-3(2H)-pyridazinone.

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**3,920,647**

## CERTAIN CYCLO-PENTA-PYRAZINES

**Ivon A. Flament, Geneva, Switzerland, assignor to Firmenich S.A., Geneva, Switzerland**

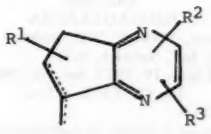
**Filed Oct. 23, 1973, Ser. No. 409,016**

**Claims priority, application Switzerland, Oct. 26, 1972, 15690/72**

**Int. Cl.² C07D** *241/38*

**U.S. Cl. 260—250 BC** **3 Claims**

1. The compounds of formula



having a double bond at one of the positions indicated by the dotted lines and wherein each of the substituents $R^1$, $R^2$ and $R^3$ represents a hydrogen atom or alkyl having from 1 to 6 carbon atoms.

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**3,920,648**

## HYPOLIPIDEMIC 5-PHENYL-2-OXYACETIC AND 2-MERCAPTOACETIC ACIDS AND ESTERS

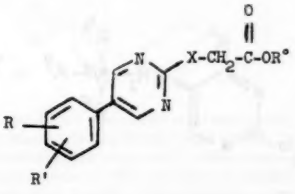
**Goetz E. Hardtmann, Florham Park, N.J., assignor to Sandoz, Inc., E. Hanover, N.J.**

**Filed June 8, 1973, Ser. No. 368,366**

**Int. Cl. C07d** *51/36*

**U.S. Cl. 260—251 R** **9 Claims**

1. A compound of the formula:



wherein:

X is oxygen or sulfur,

$R^o$ is hydrogen or alkyl of 1 to 4 carbon atoms, and

R and R′ are, independently, hydrogen, fluoro, chloro, bromo alkyl of 1 to 4 carbon atoms or alkoxy of 1 to 4 carbon atoms.

### 3,920,649
### PROCESS FOR THE PREPARATION OF CHLOROPYRIMIDINES

**Gunther Beck, Leverkusen; Fritz Döring, Odenthal-Globusch; Hans Holtschmidt, Berg.Gladbach, and Kurt Ley, Odenthal-Globusch, all of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen-Bayerwerk, Germany**

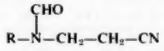
**Filed Feb. 15, 1974, Ser. No. 443,120**

**Claims priority, application Germany, Feb. 17, 1973, 2307863**

**Int. Cl.² C07D** *239/00*

**U.S. Cl. 260—251 R** **23 Claims**

1. Process for preparing a chloropyrimidine comprising treating a formamide of the formula



wherein:

R is $C_1$-$C_3$- alkyl or $C_2$-$C_4$-alkenyl; or $C_1$-$C_4$-alkyl or $C_2$-$C_4$-alkenyl substituted by chlorine, hydroxy, $C_1$-$C_4$-alkoxy or phenyl; with an acid chloride and excess chlorine at a temperature of 0° to 100°C.

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### 3,920,650
### ISOALLOXAZINES

**Claude F. Spencer, Norwich, N.Y., assignor to Morton-Norwich Products, Inc., Norwich, N.Y.**

**Filed Sept. 19, 1973, Ser. No. 398,753**

**Int. Cl.² C07D** *475/02*

**U.S. Cl. 260—251.5** **26 Claims**

1. The compound 7-chloro-10-pentylisoalloxazine.

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### 3,920,651
### QUATERNARY AMMONIUM COMPOUNDS

**Zoltan Ecsery; Judit Hermann nee Voros; Nee Voros; Zoltan Torok, all of Budapest, and Peter Dvorcsak, Ocsa, all of Hungary, assignors to Chinoin Gyogyszer- Es Vegyeszeti Termekek Gyara Rt., Budapest, Hungary**

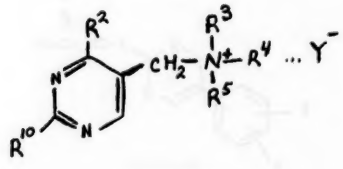
**Filed Oct. 24, 1972, Ser. No. 300,233**

**Claims priority, application Hungary, Nov. 1, 1971, OE 1182**

**Int. Cl.² C07D** *239/42*

**U.S. Cl. 260—256.4 N** **6 Claims**

1. A quaternary ammonium compound of the formula



wherein

$R^{10}$ is propyl

$R^2$ is amino or chloro,

$R^3$, $R^4$ and $R^5$ are methyl, ethyl, propyl, or benzyl;

Y is an iodide, bromide or chloride anion, or the hydrogen iodide, hydrogen bromide or hydrogen chloride acid addition salt of said formula.

### 3,920,652
### AROMATIC SUBSTITUTED PYRAZOLA [1,5A] PYRIMIDINE COMPOUNDS USEFUL AS XANTHINE OXIDASE INHIBITORS

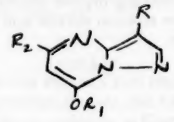
**Robert H. Springer, Santa Ana; Darrell E. O'Brien, Mission Viejo, and Lionel N. Simon, Santa Ana, all of Calif., assignors to ICN Pharmaceuticals, Inc., Irvine, Calif.**

**Continuation-in-part of Ser. No. 172,195, Aug. 16, 1971, abandoned. This application June 8, 1972, Ser. No. 261,103**

**Int. Cl.² C07D** *471/04*

**U.S. Cl. 260—256.4 F** **15 Claims**

1. A compound of the formula



wherein R is phenyl, m-methylphenyl, p-methylphenyl, p-halophenyl, p-acetamidophenyl, 3,4-methylenedioxyphenyl, α-naphthyl or 3-pyridyl; $R_1$ is H, alkali metal or ammonium; and $R_2$ is H or $—OR_1$.

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### 3,920,653
### 1-AMINOURACIL COMPOUNDS AND HERBICIDAL COMPOSITIONS

**Jürgen Wenzelburger; Gerhard Jäger, both of Wuppertal; Ludwig Eue, and Robert R. Schmidt, both of Cologne, all of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany**

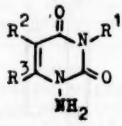
**Filed Feb. 7, 1973, Ser. No. 330,524**

**Claims priority, application Germany, Feb. 18, 1972, 2207549**

**Int. Cl.² C07D** *239/10*

**U.S. Cl. 260—256.4 C** **5 Claims**

1. 1-Aminouracil compound of the formula



in which

$R^1$ is alkyl of one to 13 carbon atoms, alkenyl of three to six carbon atoms, alkynyl of three to six carbon atoms, cycloalkyl of five to eight carbon atoms, alkylcycloalkyl of five to eight carbon atoms and one to three alkyl side chain carbon atoms, mono-halocycloalkyl of five to eight carbon atoms, norbornylmethyl, haloalkyl of two to six carbon atoms and one to three halogen atoms, monocyanoalkyl of two to six carbon atoms, alkoxyalkyl, alkoxycarbonylalkyl of one to four carbon atoms in the alkyl part and one to three carbon atoms in the alkoxy part, alkylcarbonyl of two to six carbon atoms in the alkyl part, alkoxyalkylcarbonyl of two to six carbon atoms in the alkyl part and one to four carbon atoms in the alkoxy part, aroxyalkylcarbonyl of from six or ten carbon atoms in the aryl part and one or two carbon atoms in the alkyl part, aralkyl of from six or 10 carbon atoms in the aryl part and one or two carbon atoms in the alkyl part, aralkyl of from six or 10 carbon atoms in the aryl part and one or two carbon atoms in the alkyl part and substituted in the aryl part, arylcarbonyl of from six or 10 carbon atoms in the aryl part, phenoxycarbonyl, substituted phenoxycarbonyl, aryl of from six or 10 carbon atoms, or substituted aryl of from six or 10 carbon atoms, wherein the

substituents on said substituted moieties are selected from the group consisting of straight-chained or branched alkyl of from one to six carbon atoms, haloalkyl of from one to four carbon atoms and one to three halogen atoms, alkoxy of from one to four carbon atoms, dialkylamino of from one to four carbon atoms in the straight chain or branched alkyl part, nitro, nitrile, halogen, haloalkoxy of from one to two carbon atoms and three to five halogen atoms and alkoxycarbonylalkenyl of from two or three carbon atoms in the alkenyl part and one to three carbon atoms in the alkyl part; and wherein $R_1$ has not more than 16 carbon atoms;

$R^2$ is hydrogen, halogen, alkyl having not more than 16 carbon atoms, or aryl of from six or 10 carbon atoms optionally substituted by a substituent as recited above; and

$R^3$ is alkyl of one to six carbon atoms, or phenylalkyl with one to three carbon atoms in the alkyl part,

and herbicidally acceptable salts of such compound.

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**3,920,654**

**METHYL-(4-METHYLPHENYL)-SUBSTITUTED-TETRAOLO(1,5-A)PYRIMIDINE**

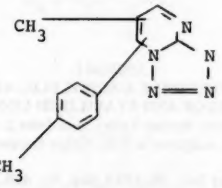
**Fred Y. Edamura, Concord, and Ronald J. Sbragia, Clayton, both of Calif., assignors to The Dow Chemical Company, Midland, Mich.**

**Filed Mar. 14, 1974, Ser. No. 451,668**

**Int. Cl.² C07D** *239/00*

**U.S. Cl. 260—256.4 F** **1 Claim**

**1.** A methyl-(4-methylphenyl)-substituted tetrazolo(1,5-a)pyrimidine compound having the general formula:



wherein the methyl substituent is in the 5(or 7)- position and the 4-methylphenyl substituent is in the 7(or 5)- position, said compound being the product of a process comprising the steps of (1) forming a reaction mixture containing a sodium 1-(4-methylphenyl)-1,3-butanedione intermediate by the reaction of about two molar proportions of p-methylacetophenone and sodium metal in the presence of ethylacetate, (2) reacting mixture of step (1) with about 2 molar proportions of 5-aminotetrazole monohydrate in the presence of a carrier medium under reflux conditions to form a reaction mixture containing a metyyl-(4-methylphenyl)-substituted 4,5-dihydrotetrazolo(1,5-a)pyrimidin-5-ol intermediate, (3) recovering said intermediate formed in step (2), (4) dissolving the intermediate recovered in step (3) in a suitable carrier medium, and (5) treating said intermediate solution of step (4) with a concentrated acid, thereby dehydrating said intermediate to the methyl-(4-methylphenyl)-substituted tetrazolo(1,5-a)pyrimidine compound.

**3,920,655**

**NITROIMIDAZOLYL BENZOQUINAZOLINES**

**Clemens Rufer; Eberhard Schroder, and Hans-Joachim Kessler, all of Berlin, Germany, assignors to Schering Aktiengesellschaft, Berlin and Bergkamen, Germany**

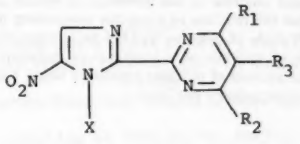
**Filed Feb. 9, 1973, Ser. No. 331,114**

**Claims priority, application Germany, Feb. 19, 1972, 2208518; Nov. 7, 1972, 2255079**

**Int. Cl.² C07D** *403/04*

**U.S. Cl. 260—256.4 Q** **5 Claims**

**1.** A compound of the formula



and physiologically acceptable acid addition salts thereof wherein X is alkyl of 1–4 carbon atoms, $R_1$ is a hydrogen atom, alkyl of 1–4 carbon atoms, phenyl or trifluoromethyl, $R_2$ is phenyl and $R_3$ is $—CH_2—$ or $—CH_2—CH_2—$ joined to the 2-position of the phenyl ring.

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**3,920,656**

**METHOD OF MAKING BARBITURIC ACID COMPOUNDS**

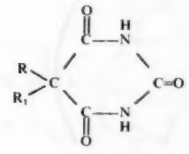
**Julius A. Vida, Boston, Mass., assignor to The Kendall Company, Walpole, Mass.**

**Continuation-in-part of Ser. Nos. 773,967, Nov. 6, 1968, abandoned, and Ser. No. 1,894, Jan. 9, 1970, abandoned, which is a continuation-in-part of Ser. No. 796,606, Feb. 4, 1969, abandoned. This application June 11, 1973, Ser. No. 368,481**

**Int. Cl.² C07D** *239/62*

**U.S. Cl. 260—257** **9 Claims**

**1.** The method of making N,N'-dialkoxyalkyl or N,N'-dibenzyloxyalkyl 5,5-disubstituted barbituric acid compounds which consists essentially of mixing (1) a barbituric starting material having the formula



wherein R and $R_1$ are phenyl and ethyl respectively, or R and $R_1$ are individually alkyl or alkenyl each having 2 to 5 carbon atoms or cycloalkenyl having 5 to 7 carbon atoms with (2) an alkaline material selected from the group consisting of sodium hydride, potassium hydride, lithium hydride, and potassium tertiary butoxide, in (3) a non-aqueous solvent for said starting material inert to said materials to form a reaction mixture, the molar amount of said alkaline material being at least twice that of the barbituric starting material, and subsequently mixing with said reaction mixture a haloalkyl alkyl ether or a haloalkyl benzyl ether in a molar amount at least twice that of the barbituric starting material.

3,920,657

## PROCESS FOR THE PRODUCTION OF 2-CHLOROPYRIDINE

Helmut Beschke, Grossauheim, and Wilhelm Alfons Schuler, Bad Homburg, both of Germany, assignors to Deutsche Gold- und Silber-Scheideanstalt vormals Roessler, Germany

Filed Oct. 19, 1973, Ser. No. 408,050
Claims priority, application Germany, Oct. 24, 1972, 2252002
Int. Cl.² C07D 213/02
U.S. Cl. 260—290 HL 14 Claims

1. A process for the production of 2-chloropyridine from pyridine and chlorine in the presence of steam comprising carrying out the reaction in a reactor comprising nickel with 0.4 to 0.48 mole of chlorine and 0.5 to 2 moles of steam for each mole of pyridine at a temperature between 300° and 400°C., the amount of pyridine employed being 1 to 4 kg per liter of reactor volume per hour.

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3,920,658

## COATED TENNIS STRING AND PROCESS FOR COATING

Martin James Benson, 4107 N. Spaulding Ave., Chicago, Ill. 60618

Continuation-in-part of Ser. No. 219,580, Jan. 20, 1972, abandoned. This application Nov. 23, 1973, Ser. No. 418,432
Int. Cl.² D02G 3/36
U.S. Cl. 428—395 4 Claims

1. A tennis string of gut, nylon, or polyester, which is coated with a coating resin containing sufficient fine, granular material to significantly increase the friction of string against ball.

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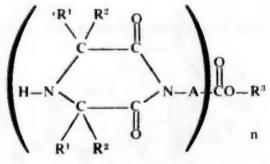
3,920,659

## CERTAIN ALKYL ALKANOATE DERIVATIVES OF SUBSTITUTED PIPERAZINO-DIONES

Chester E. Ramey, Spring Valley, and John J. Luzzi, Carmel, both of N.Y., assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Continuation-in-part of Ser. No. 239,795, March 30, 1972, abandoned. This application July 5, 1973, Ser. No. 376,785
Int. Cl.² C07D 241/00
U.S. Cl. 260—268 TR 11 Claims

1. A compound of the formula



wherein

$R^1$ and $R^2$ together with the carbon to which they are bound are cyclopentyl or cyclohexyl, which is unsubstituted or substituted with methyl;

$n$ is an integer of from 1 to 2;

when $n$ is 1, $R^3$ is alkyl of from 1 to 20 carbon atoms;

when $n$ is 2, $R^3$ is alkylene of from 2 to 8 carbon atoms; and

A is straight or branched chain (lower) alkylene having from 1 to 6 carbon atoms with the limitation that the terminals of said alkylene bear only hydrogen or one (lower) alkyl.

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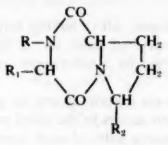
3,920,660

## TETRAHYDROPYRROLO[1,2-A]PYRAZINE-1(2H),4(3H)-DIONES

Luigi Fontanella, and Luigi Mariani, both of Milan, Italy, assignors to Gruppo Lepetit S.p.A., Milan, Italy

Filed Oct. 19, 1973, Ser. No. 408,243
Claims priority, application Italy, Nov. 3, 1972, 31276/72
Int. Cl.² C07D 241/00
U.S. Cl. 260—250 BC 3 Claims

1. A compound represented by the formula



wherein R represents hydrogen, lower alkyl, phenyl, substituted phenyl having up to 2 substituents selected from lower alkyl, lower alkoxy, fluoro, chloro and bromo, benzyl or substituted benzyl having up to 2 substituents selected from lower alkyl, lower alkoxy, fluoro, chloro, and bromo; $R_1$ represents hydrogen or lower alkyl; $R_2$ represents (a) $COR_3$ wherein $R_3$ is selected from the group consisting of hydroxy, lower alkoxy, mono- and di-lower alkylamino-lower alkoxy, amino mono- and di-lower alkylamino, mono- and di-lower alkylamino-lower alkylamino, phenylamino, substituted phenylamino wherein substituted phenyl is as defined above, hydroxyamino and morpholino, pyrrolidino, piperidino and piperazino which said hetero groups may be substituted with up to 2 lower alkyl groups or (b) $CH_2R_4$ wherein $R_4$ is selected from hydroxy, carboxy, carbo(lower alkoxy), 1 to 4 carbon alkanoyloxy and carbamyloxy.

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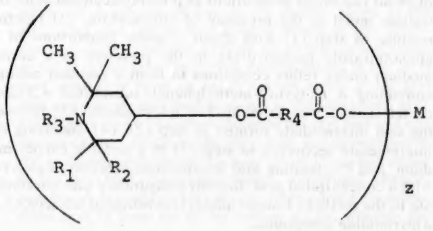
3,920,661

## HINDERED PIPERIDINE CARBOXYLIC ACIDS, METAL SALTS THEREOF AND STABILIZED COMPOSITIONS

Chester E. Ramey, Spring Valley, and John J. Luzzi, Carmel, both of N.Y., assignors to Ciba Geigy Corporation, Ardsley, N.Y.

Filed Dec. 28, 1973, Ser. No. 429,232
Int. Cl.² C07D 211/46
U.S. Cl. 260—270 C 11 Claims

1. A compound of the formula



wherein

$R_1$ and $R_2$ independently of each other are straight-or singly branched alkyl of formula

$$-CH_2+C_nH_{2n+1})$$

where

$n$ is 0 to 5, or together with the carbon to which they are bound form a cyclopentyl or cyclohexyl ring, which is unsubstituted or substituted with a methyl group,

$R_3$ is hydrogen, straight-or singly branched alkyl of formula $-CH_2+C_nH_{2n+1})$

where

$n$ is 0 to 11,

$\beta$-methoxyethyl, alkenyl having 3 or 4 carbon atoms, propargyl, benzyl, or methyl substituted benzyl,

$R_4$ is st.aight-or branched-chain alkylene having 5 to 8 carbon atoms, or

$$(CH_2)_mY(CH_2)_m$$

wherein Y is oxygen or sulfur and m is an integer of 1 to 3, M is a metal selected from the group consisting of nickel, manganese, zinc, iron, cobalt, tin and di-n-alkyl tin of up to 8 carbon atoms, and

$z$ has a value of from 1 to 4, the value of $z$ being the same as the available valence of M.

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## 3,920,662
## PERINONE DYESTUFFS AND PROCESS FOR PREPARING THEM

**Helmut Troster, Frankfurt am Main, Germany, assignor to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany**

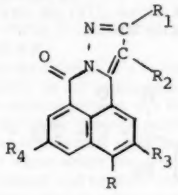
**Filed Aug. 2, 1973, Ser. No. 384,794**

**Claims priority, application Germany, Aug. 4, 1972, 2238378**

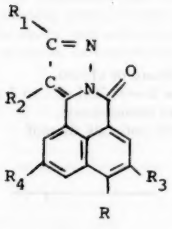
**Int. Cl.[2] C07D** *217/24*

**U.S. Cl. 260—283 S** **5 Claims**

1. Dyestuffs consisting of the mixture of isomers of the formulae



and



wherein $R_1$ is hydrogen, alkyl with 1 to 20 carbon atoms, alkoxyalkyl or alkoxycarbonyl each with up to 4 carbon atoms, benzyl, alkoxycarbonyl with up to 20 carbon atoms or phenyl, $R_2$ is alkoxycarbonyl with up to 20 carbon atoms, cyano, alkanoyl, alkoxyalkoxycarbonyl each with up to 4 carbon atoms, carbonamido, phenylcarbonamido, mono- or dialkylcarbonamido with up to 8 carbon atoms or cyclohexylcarbonamido, $R_3$ and $R_4$ are identical and are hydrogen or alkoxy with 1 to 4 carbon atoms or $R_3$ is alkoxy with 1 to 4 carbon atoms and $R_4$ is hydrogen and R is phenylthio which may be substituted by one or two chlorine or bromine atoms, alkyl, alkoxy, carbalkoxy, alkylsulfonyl groups each with up to 4 carbon atoms or a cyano, trifluoromethyl or nitro group, naphthylthio, pyridinethio, benzimidazolyl-2-thio, benzoxazolyl-2-thio or benzthiazolyl-2-thio.

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## 3,920,663
## METHOD FOR THE EXTRACTION OF LYSERGOL AND ERGOT ALKALOIDS FROM PLANTS OF THE IPOMOEA GENUS

**Giorgio Ferrari, Milan, Italy, assignor to Simes S.p.A., Milan, Italy**

**Filed Aug. 14, 1972, Ser. No. 280,212**

**Claims priority, application Belgium, Aug. 17, 1971, 107138; Jan. 14, 1972, 112886**

**Int. Cl.[2] C07D** *519/02*

**U.S. Cl. 260—285.5** **13 Claims**

1. A method for the preparation of lysergol and ergolic alkaloids comprising the steps of extracting these alkaloids with a solvent from the seeds of the plant Kaladana, that is, a plant of the family Convolvulaceae, section of Ipomoeae, genus Calonyction (Choisy) Hallier f. nova species, and concentrating the extract.

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## 3,920,664
## D-2-HALO-6-ALKYL-8-SUBSTITUTED ERGOLINES AND RELATED COMPOUNDS

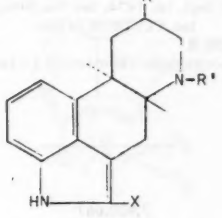
**James A. Clemens; Edmund C. Kornfeld, and Nicholas J. Bach, all of Indianapolis, Ind., assignors to Eli Lilly and Company, Indianapolis, Ind.**

**Continuation-in-part of Ser. No. 273,902, July 21, 1972, abandoned. This application Nov. 28, 1973, Ser. No. 419,566**

**Int. Cl.[2] C07D** *457/02*

**U.S. Cl. 260—285.5** **8 Claims**

1. Compounds of the formula



wherein X is Cl, Br, I, $CH_3$ or CN, R is $CH_2$–CN or

and R′ is $C_1$–$C_4$ primary alkyl, H or CN and non-toxic salts thereof formed with pharmaceutically-acceptable acids.

## 3,920,665
## BERBINE COMPOUNDS

**Fumitake Shimada, Iwatsuki; Tetsuro Ikekawa, Narashino; Kooichi Tachibana, Ohmiya; Tomio Endo, Kobe; Tetsuo Kohno, Urawa; Hideo Kuroda, Urawa; Yoshiaki Ikeda, Tokyo; Yoshimi Okazaki, Tokyo, and Yoshio Sawa, Nishinomiya, all of Japan, assignors to Kanebo, Ltd., Tokyo and Tetsuro Ikekawa, Chiba, both of, Japan**

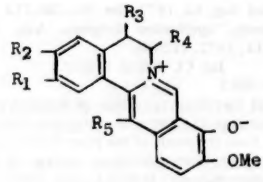
**Filed Sept. 28, 1973, Ser. No. 401,690**

**Claims priority, application Japan, June 25, 1973, 48-71468; Oct. 19, 1972, 47-104645; Sept. 4, 1973, 48-99647; Sept. 4, 1973, 48-99646**

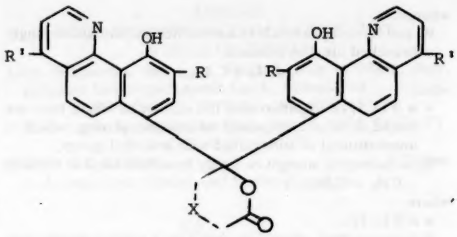
**Int. Cl.[2] C07D** *215/20*

**U.S. Cl. 260—286 Q** **10 Claims**

1. A berbine compound of the formula:



wherein $R_1$ and $R_2$ are each methoxy or jointly methylenedioxy; $R_3$ and $R_4$ are each hydrogen or jointly a covalent bond; and $R_5$ is alkyl of 1–3 carbon atoms, alkoxy of 1–3 carbon atoms or allyl, with the proviso that when $R_1$ and $R_2$ are each a methoxy and $R_3$ and $R_4$ are each hydrogen, $R_5$ is not methyl; or a pharmaceutically acceptable acid-addition salt thereof.



wherein R is selected from hydrogen and sulfo, R′ is selected from hydrogen and alkyl having 1 to 20 carbon atoms and X represents the atoms necessary to complete a ring-closing moiety selected from phthalide, carboxy substituted phthalide, and naphthalide.

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## 3,920,666
## 6,6A,7,11B-TETRAHYDRO-5H-INDENO(2,1-C)ISOQUINOLINE HYDROCHLORIDE

**Thomas J. Schwan, Norwich, N.Y., assignor to Morton-Norwich Products, Inc., Norwich, N.Y.**

**Filed Sept. 16, 1974, Ser. No. 506,295**

**Int. Cl.[2] C07D** *217/06*

**U.S. Cl. 260—286 R** **1 Claim**

1. 6,6a,7,11b-tetrahydro-5H-indeno[2,1-c]isoquinoline hydrochloride.

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## 3,920,667
## 3,3-DI-(SUBSTITUTED AZAPHENANTHEN-8-YL)PHTHALIDES AND NAPHTHALIDES

**Elbert M. Idelson, Newton Lower Falls, Mass., assignor to Polaroid Corporation, Cambridge, Mass.**

**Division of Ser. No. 177,513, Sept. 2, 1971, Pat. No. 3,779,754. This application Sept. 17, 1973, Ser. No. 398,195**

**Int. Cl.[2] C07D** *215/14*

**U.S. Cl. 260—287 CF** **4 Claims**

1. An indicator dye having the formula:



wherein R is selected from hydrogen and sulfo, R′ is selected from hydrogen and alkyl having 1 to 20 carbon atoms and X represents the atoms necessary to complete a ring-closing moiety selected from phthalide, carboxy substituted phthalide, and naphthalide.

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## 3,920,668
## ANTIPHLOGISTIC 1-(HYDROXY OR CARBOXYLIC ACYLOXY)-3-(2′-HALO-4-BIPHENYLYL)

**Josef Nickl; Helmut Teufel; Wolfhard Engel; Ernst Seeger, and Gunther Engelhardt, all of Biberach an der Riss, Germany, assignors to Boehringer Ingelheim GmbH, Ingelheim am Rhein, Germany**

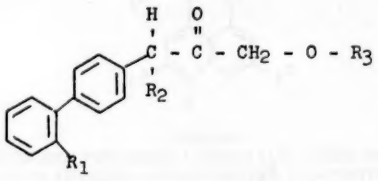
**Filed May 29, 1974, Ser. No. 474,181**

**Claims priority, application Germany, June 7, 1973, 2328973**

**Int. Cl.[2] C07D** *213/30*; **A61K** *31/44*

**U.S. Cl. 260—295 R** **2 Claims**

1. A compound of the formula



wherein

$R_1$ is hydrogen, fluoro or chloro,

$R_2$ is hydrogen or lower alkyl of 1 to 3 carbon atoms and

$R_3$ is nicotinoyl or isonicotinoyl,

or an optically active antipode thereof.

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## 3,920,669
## IMIDAZO[4,5-b] PYRIDINE DERIVATIVES

**Haukur Kristinsson, Bottmingen; Adolf Hubele, Magden, and Ernst Aufderhaar, Kaiseraugst, all of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.**

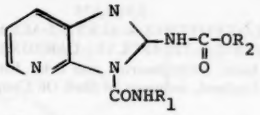
**Filed Mar. 4, 1974, Ser. No. 447,805**

**Claims priority, application Switzerland, Mar. 7, 1973, 3317/73; Jan. 28, 1974, 1105/74**

**Int. Cl.[2] C07D** *401/04*

**U.S. Cl. 260—295 CA** **2 Claims**

1. An imidazo (4,5-b) pyridine of the formula



wherein

$R_1$ represents alkyl of from 1 to 12 carbon atoms; haloalkyl of from 2 to 4 carbon atoms; alkoxyalkyl having a total of 3 or 4 carbon atoms; alkenyl of 3 or 4 carbon atoms; cycloalkyl of from 3 to 10 carbon atoms; phenyl; phenyl mono-substituted by lower alkyl, trifluoromethyl or nitro; phenyl mono- or di- substituted by halogen; or benzyl, and

$R_2$ represents alkyl of from 1 to 4 carbon atoms.

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3,920,670

## PROCESS FOR HYDROLYSIS OF NITRILES

Richard V. Norton, Wilmington, Del., assignor to Sun Ventures, Inc., St. Davids, Pa.

Filed Oct. 10, 1973, Ser. No. 404,966

Int. Cl.² C07D *213/55;* C07C *63/04, 63/14*

U.S. Cl. 260—295.5 R 10 Claims

1. A process for the catalytic acid hydrolysis of an aromatic or heterocyclic nitrile to the corresponding acid which comprises heating an aqueous solution of a nitrile from the group consisting of nitriles of the benzene, naphthalene and heterocyclic series and an acid catalyst which has an appreciable rate of hydrolysis and whose amide has a vapor pressure greater than the nitrile derived acid product, said heating being carried out in a reactor held at a temperature and pressure to maintain liquid reflux conditions, whereby hydrolysis of the nitrile occurs and the ammonium salt of the acid catalyst which forms is pyrolyzed to amide, distilling off vapors of said acid catalyst and the amide, and separating from said reactor the corresponding aromatic or heterocyclic acid products in high purity.

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3,920,671

## CERTAIN PHOSPHORUS ACID ESTERS

Kurt Rufenacht, Basel, Switzerland, assignor to Ciba-Geigy Corporation, Ardsley, N.Y.

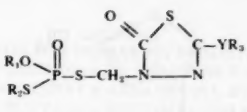
Filed Oct. 9, 1973, Ser. No. 404,572

Claims priority, application Switzerland, Oct. 6, 1972, 14695/72; July 31, 1973, 11147/73

Int. Cl.² C07D *285/12*

U.S. Cl. 260—302 E 9 Claims

1. A compound of the formula



wherein

$R_1$ represents methyl or ethyl,

$R_2$ represents methoxyethyl or ethoxyethyl,

$R_3$ represents $C_1$-$C_4$ alkyl, and

Y represents oxygen or sulphur.

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3,920,672

## THIACYCL [2.2.2.]AZINE CARBOXYLIC ACIDS

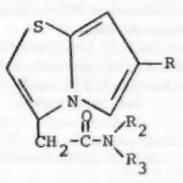
Karl G. Untch, Los Altos, and John O. Gardner, Palo Alto, both of Calif., assignors to Syntex (U.S.A.) Inc., Palo Alto, Calif.

Filed Aug. 22, 1974, Ser. No. 499,713

Int. Cl.² C07D *513/04*

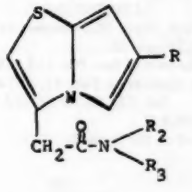
U.S. Cl. 260—306.7 R 13 Claims

1. A compound represented by the formula



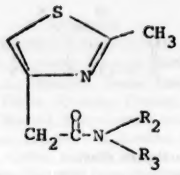
wherein R is phenyl or phenyl monosubstituted in the meta or para position with fluoro, chloro, lower alkyl of from one to four carbon atoms or lower alkoxy of from one to four carbon atoms, $R_2$ and $R_3$ taken independently are each lower alkyl of from one to three carbon atoms and $R_2$ and $R_3$ taken together are polymethylene of from four to six carbon atoms.

9. A method for the preparation of a compound represented by the formula

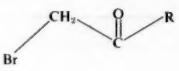


wherein R is phenyl or phenyl monosubstituted in the meta or para position with fluoro, chloro, lower alkyl of from one to four carbon atoms or lower alkoxy of from one to four carbon atoms, $R_2$ and $R_3$ taken independently are each lower alkyl of from one to three carbon atoms and $R_2$ and $R_3$ taken together are polymethylene of from four to six carbon atoms, which comprises

a. intimately contacting at an elevated temperature a compound represented by the formula



wherein $R_2$ and $R_3$ are as above, with a compound represented by the formula



wherein R is as above, to form a salt, and

b. contacting the salt thus formed with a hydroxide base in an inert organic solvent.

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**3,920,673**

**OXAZOLIDINE OF ENDO-BICYCLO-[3.10]HEX-2-ENE-6-ARBOXLDEHYDE**

**Robert C. Kelly, Kalamazoo, Mich., assignor to The Upjohn Company, Kalamazoo, Mich.**

**Division of Ser. No. 181,246, Sept. 16, 1971, Pat. No. 3,711,515, which is a continuation-in-part of Ser. No. 93,483, Nov. 27, 1970, abandoned. This application Dec. 15, 1972, Ser. No. 315,363**

*Disclosure was also published under Trial Voluntary Protest Program on Jan. 28, 1975.*

**Int. Cl. C07D** *263/52*

**U.S. Cl. 260—307 F** **1 Claim**

1. 2-(Endo-bicyclo [3.1.0]hex-2-en-6-yl)-3,4-dimethyl-5-phenyl oxazolidine, being characterized by a melting point of 100°–103° C.

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**3,920,674**

**CERTAIN 1-(1,3,4-THIADIAZOL-2-YL)IMIDAZOLIDINONE-(2) COMPOUNDS**

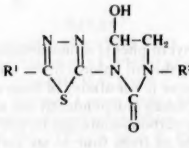
**John Krenzer, Oak Park, Ill., assignor to Velsicol Chemical Corporation, Chicago, Ill.**

**Continuation-in-part of Ser. No. 432,269, Jan. 10, 1974, abandoned. This application Feb. 15, 1974, Ser. No. 442,702**

**Int. Cl.² C07D** *513/02*

**U.S. Cl. 260—306.8 D** **6 Claims**

1. A compound of the formula



wherein $R^1$ is cycloalkyl of from 3 to 7 carbon atoms optionally substituted with lower alkyl, lower alkoxy, chlorine, bromine or hydroxy, and $R^2$ is lower alkyl.

**3,920,675**

**4-BENZYLOXYMETHYL-4-ALKYL-2-ALKYL-1,3-DIOXOLANE-2(N-THIAZOLYL) CARBOXAMIDES**

**Eirlys R. Isaac, Sittingbourne, and Peter Kirby, Maidstone, both of England, assignors to Shell Oil Company, Houston, Tex.**

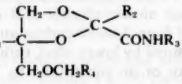
**Filed June 25, 1974, Ser. No. 482,935**

**Claims priority, application United Kingdom, July 3, 1973, 31604/73**

**Int. Cl.² C07D** *405/12, 417/12*

**U.S. Cl. 260—306.8 R** **3 Claims**

1. An amide derivative of the formula



wherein $R_1$ and $R_2$ each represents an alkyl group of 1–6 carbon atoms, $R_3$ represents thiazolyl; and $R_4$ represents a phenyl group optionally substituted by fluorine or chlorine or by an alkyl group of 1–6 carbon atoms.

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**3,920,676**

**PHOSPHORUS ACID ESTERS OF 5-PHENYL-1,2,4-OXADIAZOLYL COMPOUNDS**

**Willy Meyer, Basel, and Beat Bohner, Binningen, all of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.**

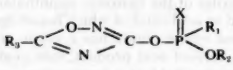
**Filed Mar. 12, 1973, Ser. No. 340,431**

**Claims priority, application Switzerland, Mar. 16, 1972, 3936/72; Feb. 12, 1973, 1994/73**

**Int. Cl.² C07D** *271/06*

**U.S. Cl. 260—307 G** **7 Claims**

1. A compound of the formula



wherein $R_1$ represents ethyl, methoxy or ethoxy, $R_2$ represents methyl or ethyl, $R_3$ represents phenyl monosubstituted by methyl, methoxy, cyano, fluorine, chlorine, bromine or nitro, or phenyl di-substituted by chlorine, and X represents sulfur.

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**3,920,677**

**PHOSPHORUS ACID ESTERS OF 5-ALKYL-AND-ARALKYL-1,2,4-OXADIAZOLYL COMPOUNDS**

**Willy Meyer, Basel, and Beat Bohner, Binningen, both of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.**

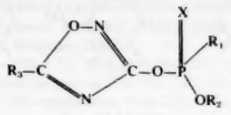
**Filed Mar. 12, 1973, Ser. No. 340,432**

**Claims priority, application Switzerland, Mar. 16, 1972, 3937/72; Feb. 12, 1973, 1995/73**

**Int. Cl.² C07D** *271/06*

**U.S. Cl. 260—307 G** **8 Claims**

1. A compound of the formula



wherein $R_1$ represents $C_1$–$C_4$ alkyl or $C_1$–$C_4$ alkoxy; $R_2$ represents $C_1$–$C_4$ alkyl; $R_3$ represents $-CH_2Cl$, $-CHCl_2$, $-CCl_3$, $-CH_2-CH_2-Br$, $-CF_3$, $-CH_2-CH_2-CH_2Cl$, $-CH_2-O-C_6H_5$, $-CH_2-S-C_6H_5$, $-CH_2-S-CH_3$, $-CH_2-O-CH_3$, $-CH_2-O-CH(CH_3)_2$, $-CH_2-S-CH_2-CH_3$, $-CH_2-CH_2-O-CH_2-CH_3$, $-CH_2-SO_2-CH_3$, $-CH_2-SO-C_6H_5$, $-CH_2-SO_2-C_6H_5$, $-CH_2-SO-CH_3$ or $-CH_2-CH_2-C_6H_3$; and X represents oxygen or sulphur.

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**3,920,678**

## PROCESS FOR PRODUCING 4,5,6,7-TETRAHYDRO BENZIMIDAZOLES

**Ivan Butula, Heidelberg-Pfaffengrund, Germany, assignor to Rhein-Chemie GmbH, Mannheim, Germany**

**Continuation of Ser. No. 807,399, March 14, 1969, abandoned. This application May 17, 1973, Ser. No. 361,106**

**Claims priority, application United Kingdom, Mar. 15, 1968, 12750/68**

**Int. Cl.² C07D** *235/18*

**U.S. Cl. 260—309** **12 Claims**

1. Process for the production of a 4,5,6,7-tetrahydrobenzimidazole compound which process comprises hydrogenating the corresponding benzimidazole compound in the presence of a strong mineral acid in an amount at least equivalent to the amount of basic benzimidazole compound and in the contacting presence of a catalytically significant amount of a palladium-containing catalyst selected from the group consisting of palladium metal, palladium oxide, palladium dichloride, palladium mono- and di-hydroxide, and palladium/platinum mixtures wherein said mixtures contain more palladium than platinum.

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**3,920,679**

## THIENODIAZEPINE COMPOUNDS

**Michio Nakanishi, Nakatsu; Tetsuya Tahara, Fukuoka; Kazuhiko Araki, Fukuoka, and Masami Shiroki, Fukuoka, all of Japan, assignors to Yoshitomi Pharmaceutical Industries, Ltd., Osaka, Japan**

**Filed June 21, 1973, Ser. No. 372,354**

**Claims priority, application Japan, June 22, 1972, 47-63028; July 3, 1972, 47-66923; July 3, 1972, 47-66924**

**Int. Cl.² C07D** *495/14*

**U.S. Cl. 260—309** **3 Claims**

1. The compound:
6-o-chlorophenyl-8-ethyl-4H-imidazo[2,1-c]thieno[2,3-e][1,4]-diazepine.

2. The compound:
6-o-bromophenyl-8-ethyl-4H-imidazo[2,1-c]thieno[2,3-e][1,4]-diazepine.

3. The compound:
8-ethyl-6-o-fluorophenyl-4H-imidazo[2,1-c]thieno[2,3-e][1,4]-diazepine.

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**3,920,680**

## METHOD FOR PREPARING SUBSTITUTED BENZIMIDOZOLES AND THEIR USES 1-(PHENOXYACETYL)CARBAMINOYL-2-CARBOMETHOXYAMINOBENZIMIDAZOLE

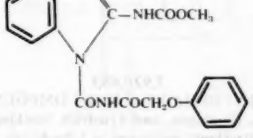
**Nikolai Mikhailovich Golyshin, Malaya Kaltinikovskaya ulitsa, 20, korpus 1, kv. 60; Elena Ivanovna Andreeva, Malaya Kaltinikovskaya ulitsa, 20, korpus 1, kv. 12; Elza Alexandrovna Dvoichenkova, Astakhovsky pereulok, 1/2, kv. 63; Nina Sergeevna Ukrainets, Krasnoprudnaya ulitsa, 14, kv. 9; Tatyana Pavlovna Skazkina, Malaya Kalitnikovskaya ulitsa, 20, korpus 1, kv. 79; Galina Viktorovna Solovieva, Semenovskaya naberezhnaya, 3/1, korpus 6, kv. 242; Margarita Romanovna Bodrova, Kutuzovsky prospekt, 27/1, kv. 90, all of Moscow; Nina Alexandrovna Rotastikova, Granitny poselok, Zavodskaya, Dolgoprudny Moskovskoi oblasti; Nikolai Nikolaevich Melnikov, ulitsa Dmitria Ulyanova, 4, korpus A, kv. 96, Moscow; Stepan Sofronovich Kukalenko, Vorontsovskaya ulitsa, 32/36, kv. 30, Moscow; Karen Armenakovich Nuridzhanian, Zeleny prospekt, 35, korpus 2, kv. 19, Moscow; Lilia Mikhailovna Nesterova, Rizhskaya ulitsa, 6, kv. 14, Narofominsk Moskovskoi oblasti; Marat Tashpulatovich Usmanov, ulitsa Gromova, 97, Tashkent; Raisa Grigorievna Novikova, Likhachevsky prospekt, 9, kv. 6, Dolgoprudny Moskovskoi oblasti; Galina Vladimirovna Kuznetsova, Shelepikhinskoe shosse, 5, kv. 64, Moscow; Stepan Dmitrievich Volodkovich, Malaya Kalitnikovskaya ulitsa, 20, korpus 1, kv. 42, Moscow; Nikolai Mikhailovich Burmakin, Malaya Kalitnikovskaya ulitsa, 20, korpus 1, kv. 57, Moscow; Valentina Ivanovna Obukhova, Sovetskaya ulitsa, 8, kv. 54, Dolgoprudny Moskovskoi oblasti; Violetta Ivanovna Monova, ulitsa Vavilova, 89, kv. 102, Moscow; Galina Nikonovna Shkuratova, Novo-Cheremushkinskaya ulitsa, 41, korpus 1, kv. 74, Moscow; Mikhail Arsenievich Sanin, Malaya Kalitnikovskaya 20, korpus 1, kv. 58, Moscow; Natalya Nikolaevna Kulagina, 5 Kozhukhovskaya ulitsa, 22, korpus 1, kv. 61, Moscow, and Nina Evgenievna Mironova, Maly Kakovinsky Pereulok, 1/8, kv. 17, Moscow, all of U.S.S.R.**

**Continuation of Ser. No. 233,716, March 10, 1972, abandoned. This application Dec. 21, 1973, Ser. No. 427,132**

**Int. Cl.² C07D** *235/32*

**U.S. Cl. 260—309.2** **1 Claim**

1. 1-(Phenoxyacetyl)carbaminoyl-2-carbomethoxyaminobenzimidazole having the formula:



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**3,920,681**

## 1-ALKYLSULPHONYL-2-TRIFLUOROMETHYL-BENZIMIDAZOLES

**Karl-Heinz Buchel, and Wilhelm Stendel, both of Wuppertal, Germany, assignors to Bayer Aktiengesellschaft, Germany**

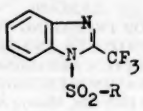
**Filed Aug. 24, 1973, Ser. No. 391,142**

**Claims priority, application Germany, Aug. 31, 1972, 2242785**

**Int. Cl.² C07D** *235/10*

**U.S. Cl. 260—309.2** **7 Claims**

1. A compound of the formula



wherein R is alkyl of 1 to 4 carbon atoms.

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3,920,682

## BENZIMIDAZOLE-1-CARBOXYLIC ACID AMIDES

Kurt Roder; Reinhold Puttner, and Ernst-A. Pieroh, all of Berlin, Germany, assignors to Schering AG, Berlin, Germany

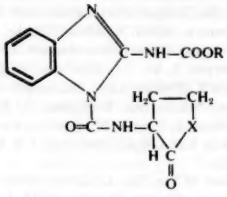
Filed Sept. 6, 1974, Ser. No. 503,807

Claims priority, application Germany, Sept. 17, 1974, 2347386

Int. Cl.[2] C07D *235/32*, *307/32*, *333/36*

U.S. Cl. 260—309.2 8 Claims

1. A benzimidazole-1-carboxylic acid amide of the formula



in which

R is an alkyl radical with 1 to 4 carbon atoms, and

X oxygen or sulfur.

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3,920,683

## DIGLYCIDYLOXYALKYL COMPOUNDS

Daniel Porret, Binningen, and Friedrich Stockinger, Therwil, both of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

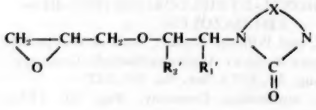
Filed Jan. 7, 1974, Ser. No. 431,241

Claims priority, application Switzerland, Jan. 8, 1973, 174/73

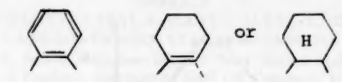
Int. Cl.[2] C07D *235/26*

U.S. Cl. 260—309.2 9 Claims

1. A diglycidyl ether of the formula



wherein X denotes a divalent radical of the formula



which is unsubstituted or substituted by halogen or lower alkyl, $R_1$ and $R_1'$ each denote hydrogen or methyl, $R_2$ and $R_2'$ each denote hydrogen, methyl, ethyl, or phenyl or $R_1$, and $R_2$, or $R_1'$ and $R_2'$ together represent trimethylene or tetramethylene.

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3,920,684

## BENZIMIDAZOLE CARBAMATES

Hans Rochling, Altenhain, Taunus; Gerhard Horlein, Frankfurt am Main, and Kurt Hartel, Hofheim, Taunus, all of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany

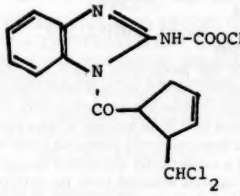
Filed June 27, 1973, Ser. No. 374,116

Claims priority, application Germany, June 29, 1972, 2231883

Int. Cl.[2] C07D *233/66*

U.S. Cl. 260—309.2 2 Claims

1. A benzimidazole having the formula



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3,920,685

## DIALKOXYPHOSPHONALKYL DERIVATIVES OF CYCLICUREIDES CONTAINING GLYCIDYL GROUPS

Daniel Porret, Binningen, and Jürgen Habermeier, Pfeffingen, both of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

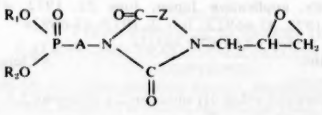
Filed Dec. 7, 1973, Ser. No. 423,363

Claims priority, application Switzerland, Dec. 12, 1972, 18031/72

Int. Cl.[2] C07D *49/34*

U.S. Cl. 260—309.5 7 Claims

1. A cyclic ureide containing phosphorus and glycidyl group of the formula



(I)

wherein Z is methylene, methylene substituted with alkyl groups of one to six carbon atoms, cyclohexylidene, or cyclopentylidene; A is alkylene of one to twelve carbon atoms, or $-CH_2CH_2OCH_2CH_2-$; $R_1$ and $R_2$ each is alkyl or alkenyl of one to four carbon atoms or $R_1$ and $R_2$ together is alkylene of two to five carbon atoms.

3,920,686

## DIPHENYLHYDANTOIN COMPOUNDS

Carlos M. Samour, Wellesley, Mass., assignor to The Kendall Company, Walpole, Mass.

Division of Ser. No. 888,943, Dec. 29, 1969, which is a continuation-in-part of Ser. No. 749,972, Aug. 5, 1968, abandoned. This application May 22, 1974, Ser. No. 472,469

Int. Cl.[2] C07D *49/34*

U.S. Cl. 260—309.5 5 Claims

1. A compound selected from the class consisting of 3-alkoxymethyl diphenylhydantoin or 1,3-dialkoxymethyl diphenylhydantoin in which each alkoxy contains 1 to 12 carbon atoms or 3-benzyloxymethyl diphenylhydantoin.

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3,920,687

## 2,3,6,7-TETRAHYDRO-6-PHENYL-5H-IMIDAZO[1,2-D][1,4]BENZODIAZEPIN-5-ONES AND DIAZEPINES

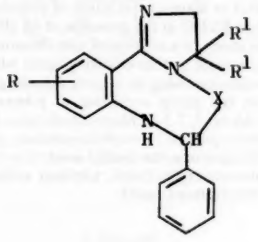
George C. Buzby, Jr., Philadelphia, and Harshavedan C. Shah, Secane, both of Pa., assignors to American Home Products Corporation, New York, N.Y.

Filed Sept. 9, 1974, Ser. No. 504,408

Int. Cl.[2] C07D *49/34*

U.S. Cl. 260—309.6 8 Claims

1. A compound of the formula:



in which

X is $-CH_2-$ or $-\overset{O}{\overset{\|}{C}}-$

R is —H or —Cl;

$R^1$ is —H or $-CH_3$; and

pharmaceutically acceptable acid addition salts thereof.

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3,920,688

## 2-IMINO DERIVATIVES OF SUBSTITUTED IMIDAZOLES

Gary L. Eilrich, Creve Coeur, and William D. Dixon, Kirkwood, both of Mo., assignors to Monsanto Company, St. Louis, Mo.

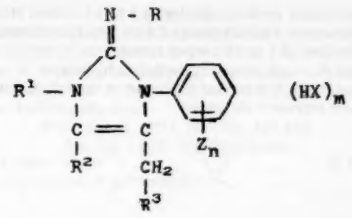
Filed Feb. 5, 1973, Ser. No. 329,787

*Disclosure was also published under Trial Voluntary Protest Program on Jan. 28, 1975.*

Int. Cl.[2] C07D *233/88*

U.S. Cl. 260—309.6 10 Claims

1. A compound of the formula



wherein:

R is lower alkyl or lower alkoxy lower alkyl;

$R^1$ is lower alkyl;

$R^2$ is lower alkyl or hydrogen;

$R^3$ is lower alkyl or hydrogen;

Z is fluoro, chloro, bromo, lower alkyl, halo lower alkyl or lower alkoxy;

*n* is an integer 0 through 2;

*m* is an integer 0 or 1; and

X is an anionic moiety of a strong acid.

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3,920,689

## N-HETEROCYCLIC PERFLUOROALKYLMONOCARBOXYLIC ACID ESTERS, PROCESSES FOR THEIR MANUFACTURE AND THEIR USE

Horst Jaeger, Bettingen, Switzerland, assignor to Ciba-Geigy AG, Basle, Switzerland

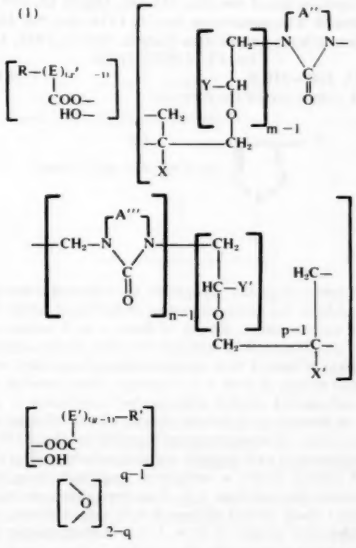
Continuation-in-part of Ser. No. 286,797, Sept. 6, 1972, which is a division of Ser. No. 95,430, Dec. 4, 1970, abandoned. This application Feb. 6, 1973, Ser. No. 330,160

Claims priority, application Switzerland, Dec. 10, 1969, 18400/69; Feb. 9, 1970, 1827/70

Int. Cl.[2] C07D *233/34*

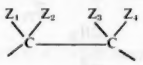
U.S. Cl. 260—309.7 12 Claims

1. A perfluoroalkylmonocarboxylic acid ester of the formula



wherein

R represents perfluoroalkyl with 4 to 14 carbon atoms,
E represents cycloalkylene of 5 to 6 carbon atoms, or n-alkylene of 1 to 10 carbon atoms,
X and $X_1$, each represent methyl or hydrogen,
Y and Y′ each represent hydrogen or methyl, A″ and A‴ each represent the group



wherein
$Z_1$, $Z_2$, $Z_3$ and $Z_4$ each represent hydrogen or alkyl of 1 to 4 carbon atoms; $q$ is 1, and
$m$, $n$, $p$ and $x'$ each represent 1 or 2.

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**3,920,690**
**HERBICIDAL TRIFLUOROMETHYLSULFONAMIDO-PYRAZOLES**
**Joseph Kenneth Harrington, Edina; Donald C. Kvam, North Oaks; Arthur Mendel, Vadnais Heights, and Jerry E. Robertson, North Oaks, all of Minn., assignors to Minnesota Mining & Manufacturing Company, Saint Paul, Minn.**
**Division of Ser. No. 142,381, May 11, 1971, Pat. No. 3,801,588, and a continuation-in-part of Ser. No. 837,932, June 30, 1969, Pat. No. 3,637,729, which is a continuation-in-part of Ser. No. 588,338, Oct. 21, 1966, abandoned. This application Jan. 28, 1974, Ser. No. 437,500**
**Int. Cl.² C07D** *231/38;* **A01N** *9/22*
**U.S. Cl. 260—310 R** **3 Claims**

1. The compound 1,3,5-trimethyl-4-trifluoromethylsulfonamidopyrazole.

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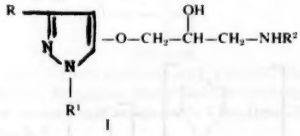
**3,920,691**
**5-(3-SUBSTITUTED AMINO-2-HYDROXYPROPOXY)-1,3-ISUBSTITUTED PYRAZOLES AND METHOD OF PREPARATION**
**Burton Kendall Wasson, Valois, and Clarence Stanley Rooney, Beaconsfield, both of Canada, assignors to Merck Sharp & Dohme (I.A.), Rahway, N.J.**
**Continuation of Ser. No. 341,446, March 15, 1973, abandoned. This application Nov. 6, 1974, Ser. No. 521,416**
**Claims priority, application Canada, May 5, 1972, 141470**
**Int. Cl.² C07D** *231/20*
**U.S. Cl. 260—310 R** **4 Claims**

1. A compound of the formula

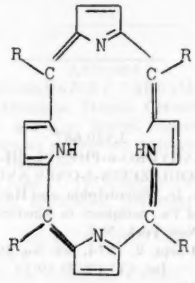


I

and pharmacologically acceptable salts thereof wherein R is selected from the group consisting of hydrogen, alkyl of from 1 to 3 carbon atoms, alkoxy of from 1 to 3 carbon atoms, phenyl and benzyl; $R^1$ is selected from the group consisting of cycloalkyl of from 3 to 6 carbon atoms, phenyl-alkyl wherein the alkyl moiety is from 1 to 3 carbon atoms, phenyl, mono- or di-substituted phenyl wherein the substituent is chloro, alkyl of from 1 to 3 carbon atoms, alkoxy of from 1 to 3 carbon atoms, or mixtures thereof; and $R^2$ is selected from the group consisting of a straight or branched chain alkyl of from 3 to 6 carbon atoms, a straight or branched chain hydroxy substituted alkyl of from 3 to 6 carbon atoms, a straight or branched chain alkinyl of from 3 to 6 carbon atoms, phenyl-alkyl the alkyl moiety of from 1 to 6 carbon atoms, and (3-indolyl)-alkyl wherein the alkyl moiety is from 1 to 6 carbon atoms.

**3,920,692**
**PRODUCTION OF MESOTETRAARYLPORPHINES**
**Walter Wielant Wiersdorff, Ludwigshafen, and Martin Fischer, Ellerstadt, both of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen (Rhine), Germany**
**Filed Feb. 19, 1974, Ser. No. 443,414**
**Claims priority, application Germany, Feb. 20, 1973, 2308252**
**Int. Cl.² C09B** *47/00*
**U.S. Cl. 260—314** **7 Claims**

1. An improved process for the production of a mesotetraarylporphine of the formula:



in which R is phenyl or phenyl bearing one or more than one of the substituents chlorine, alkyl or alkoxy of 1 to 4 carbon atoms per alkyl or alkoxy by reaction of pyrrole with an aromatic aldehyde RCHO in the presence of an alkanoic acid of 2 to 8 carbon atoms or a mixture of said alkanoic acid with an inert organic solvent and an oxidizing agent wherein the improvement comprises using an organic dehydrogenating agent selected from the group consisting of p-benzoquinone, o-chloranil, p-chloranil, 2,3-dichloro-5,6-dicyano-1,4-benzoquinone, o-naphtho,uinone, p-naphthoquinone, phenanthrenequinone, anthraquinone, the diethyl ester of an azodicarboxylic acid, diphenylpicrylhydrazyl, tritylium sulfate and nitrobenzene as the oxidizing agent.

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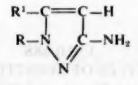
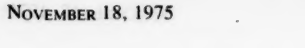
**3,920,693**
**PRODUCTION OF 3-AMINOPYRAZOLES**
**Guenter Ege, Heidelberg, Germany, assignor to BASF Aktiengesellschaft, Ludwigshafen (Rhine), Germany**
**Filed Dec. 16, 1974, Ser. No. 532,756**
**Claims priority, application Germany, Jan. 5, 1974, 2400415; Feb. 19, 1974, 2407890**
**Int. Cl.² C07D** *231/38, 231/14*
**U.S. Cl. 260—310 R** **1 Claim**

1. A process for the production of a 3-aminopyrazole of the formula:



wherein
R is hydrogen, alkyl of one to four carbon atoms, hydroxyalkyl of two or three carbon atoms, cyanoalkyl of two or three carbon atoms, carbamoylalkyl of two or three carbon atoms, cyclohexyl, benzyl or phenyl; and
$R^1$ is hydrogen, methyl, cyclohexyl or phenyl,
which comprises
reacting a compound of the formula:



wherein X is chloro or bromo,
in an alkaline medium with a hydrazine of the formula

R and $R^1$ having the meanings given above.

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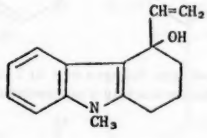
**3,920,694**

## 4-HYDROXY-9-METHYL-4-VINYL-1,2,3,4-TETRAHYDROCARBAZOLE

**Jagadish C. Sircar, Dover, and Harold Zinnes, Rockaway, both of N.J., assignors to Warner-Lambert Company, Morris Plains, N.J.**

**Division of Ser. No. 475,559, June 3, 1974. This application Feb. 18, 1975, Ser. No. 550,334**
**Int. Cl.[2] C07D** *209/88*
**U.S. Cl. 260—315** **1 Claim**

**1.** A compound of the formula:



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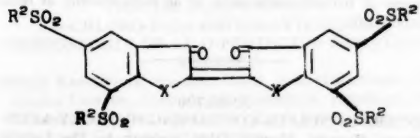
**3,920,695**

## SILICONE-COMPATIBLE INDIGO DYESTUFFS

**Carl Mayn Smith, White Bear Lake, and George Van Dyke Tiers, St. Paul, both of Minn., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.**

**Division of Ser. No. 275,190, July 26, 1972. This application Aug. 28, 1974, Ser. No. 501,212**
**Int. Cl.[2] C09B** *7/00*
**U.S. Cl. 260—322** **1 Claim**

**1.** An indigo dyestuff of the formula:



wherein X is —NH—or —S— and $R^2$ is tris(trimethylsilyloxy)-silylalkylamino of the formula



in which R is straight or branched chain unsubstituted alkylene of 1–6 carbon atoms and R' is hydrogen or unsubstituted lower alkyl of 1 to 6 carbon atoms.

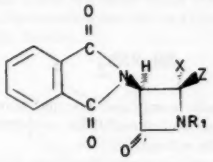
**3,920,696**

## 2S-CARBOXYALKYLTHIO-3R-IMIDOAZETIDIN-4-ONES AND COMPOUNDS USEFUL IN THEIR PREPARATION

**Stjepan P. Kukolja, Indianapolis, and Steven R. Lammert, Greenwood, both of Ind., assignors to Eli Lilly and Company, Indianapolis, Ind.**

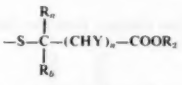
**Filed Apr. 2, 1973, Ser. No. 347,276**
**Int. Cl.[2] C07D** *205/08, 209/48*
**U.S. Cl. 260—326 S** **16 Claims**

**1.** A compound of the formula



in which $R_1$ is hydrogen or a group of the formula

in which
R is a carboxy protecting group;
Z is hydrogen, chlorine, or bromine; and
X is hydrogen, chlorine, bromine, or a group of the formula



in which $R_a$ and $R_b$ independently are hydrogen or methyl, Y is acetamido or hydroxyl, *n* is zero or 1, and $R_2$ is hydrogen or a carboxy protecting group readily cleavable by known deesterification procedures; with the limitation that one of X and Z is hydrogen, and, with the further limitation that, when $R_1$ is

one of X and Z is chlorine or bromine.

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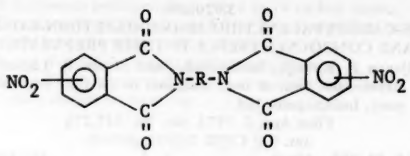
**3,920,697**

## METHOD FOR PREPARING N-SUBSTITUTED NITROPHTHALIMIDES

**Tohru Takekoshi, Scotia, N.Y., assignor to General Electric Company, Schenectady, N.Y.**

**Filed June 22, 1973, Ser. No. 372,772**
**Int. Cl.[2] C07D** *209/34*
**U.S. Cl. 260—326 N** **8 Claims**

**1.** A method for making a bis(nitrophthalimide) of the formula



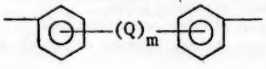
which comprises,

1 effecting reaction at a temperature in the range of from 100°C. to 170°C. between an organic diamine of the formula

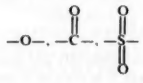
$$NH_2RNH_2$$

and a nitrophthalic compound selected from the group of nitrophthalic acids and nitrophthalic anhydrides in the presence of a phenolic solvent, and

2 recovering said bis(nitrophthalimide) from the resulting mixture of (1), where R is a divalent organo radical selected from the class consisting of (a) aromatic hydrocarbon radicals having from 6–20 carbon atoms and halogenated derivatives thereof, (b) alkylene radicals, $C_{(2-8)}$ alkylene terminated polydiorganosiloxane cycloalkylene radicals having from 2–20 carbon atoms, and (c) divalent radicals included by the formula



where Q is a member selected from the class consistig of



—S—, $-C_xH_{2x}-$ and $x$ is a whole number from 1 to 5 inclusive, and $m$ is 0 or 1.

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**3,920,698**

**NEW ORGANIC COMPOUNDS FOR USE AS FUEL ADDITIVES**

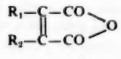
**Bernard Haemmerle; Bernard Sillion, and Gabriel De Gaudemaris, all of Grenoble, France, assignors to Institut Francais du Petrole Des Carburants et Lubrifiants, Rueil-Malmaison, France**

**Continuation of Ser. No. 127,047, March 22, 1971, abandoned. This application Apr. 8, 1974, Ser. No. 459,093**

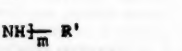
**Int. Cl.[2] C07D** *207/44*

**U.S. Cl. 260—326.5 FM** **14 Claims**

1. An imidic reaction product of a maleic anhydride of the formula



with a linear polyamine of the formula



in which $R_1$ and $R_2$ are selected from the group consisting of a hydrogen atom and a alkyl radical of 1–30 carbon atoms, the total number of carbon atoms of $R_1$ and $R_2$ being not more than 30, R' is a alkyl or alkenyl radical having 6–30 carbon atoms, $n$ is an integer from 3 to 10 and $m$ is an integer from 1 to 10, said reaction being conducted in an inert solvent and wherein the water resulting from the reaction is removed therefrom.

**3,920,699**

**PROCESS FOR THE CYCLIZATION OF ARYL(METHYLSULFINYL)-METHYL KETONES AND COMPOUNDS PRODUCED THEREBY**

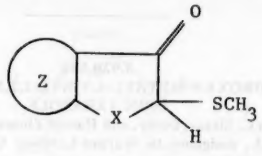
**David T. Connor, Parsippany, and Maximilian von Strandtmann, Rockaway, both of N.J., assignors to Warner-Lambert Company, Morris Plains, N.J.**

**Filed Apr. 26, 1974, Ser. No. 464,706**

**Int. Cl.[2] C07D** *307/83, 209/36, 209/60*

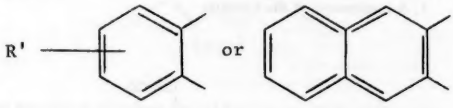
**U.S. Cl. 260—326.11** **8 Claims**

1. A process for preparing a compound of the formula I:

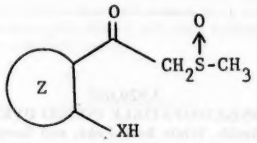


I

wherein X is —O— or —N—COR wherein R is lower alkyl, phenyl or naphthyl, and Z is



wherein R' is hydrogen, halogen or 1 to 7 carbon lower alkoxy, which comprises reacting a compound of formula II:



II

wherein X and Z are as defined above, with an equivalent amount of trifluoroacetic acid, in an inert solvent, at reflux temperature.

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**3,920,700**

**ESTERS OF SULFUR-CONTAINING HYDROXY ACIDS**

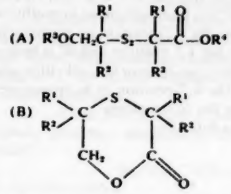
**Katsumi Hayashi, Mentor, Ohio, assignor to The Lubrizol Corporation, Cleveland, Ohio**

**Continuation-in-part of Ser. No. 164,068, July 19, 1971, abandoned, Continuation-in-part of Ser. No. 77,759, Oct. 2, 1970, Pat. No. 3,839,438, Continuation-in-part of Ser. No. 164,068, July 19, 1971, abandoned, Continuation-in-part of Ser. No. 868,617, Oct. 22, 1969, abandoned. This application Feb. 9, 1973, Ser. No. 331,144**

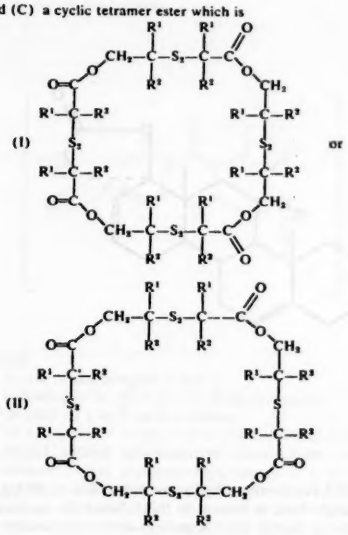
**Int. Cl.[2] C07D** *327/00*

**U.S. Cl. 260—327 R** **9 Claims**

1. An ester selected from the group consisting of:



and (C) a cyclic tetramer ester which is





## 3,920,701

## PROCESS FOR PRODUCING α-CHLORO-β-(3,4-DIHYDROXYPHENYL) PROPIONITRILE OR AN O-PROTECTED DERIVATIVE THEREOF

**Hideaki Kawashima; Masanao Ozaki, both of Kawasaki; Yoshitaka Yamada, Zushi; Izumi Kumashiro, Yokohama, and Takehiko Ichikawa, Kawasaki, all of Japan, assignors to Ajinomoto Co., Inc., Tokyo, Japan**

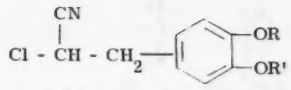
**Continuation-in-part of Ser. No. 18,703, March 11, 1970, abandoned. This application Oct. 4, 1973, Ser. No. 403,387**

**Claims priority, application Japan, Mar. 26, 1969, 44-22868; Aug. 6, 1969, 44-62157**

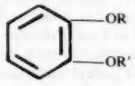
**Int. Cl.[2] C07D** *317/44*

**U.S. Cl. 260—340.5** **6 Claims**

1. A process for preparing a compound selected from the group consisting of α-chloro-β-(3,4-dihydroxyphenyl)-propionitrile and an O-protected derivative thereof, having the formula:



wherein R and R′ are independently selected from the group consisting of lower alkyl having from 1 to 6 carbon atoms and hydrogen, or R and R′ may be taken together to form a member selected from the group consisting of lower alkylene having from 2 to 6 carbon atoms, alkylidene having from 2 to 6 carbon atoms, and cyclohexylidene, which comprises the step of reacting 1,2-dihydroxybenzene or an O-protected derivative thereof of the formula



wherein R and R′ are as defined above, with 2,3-dichloropropionitrile at a mole ratio of said 2,3-dihydroxybenzene or the O-protected derivative thereof: 1,2-dichloropropionitrile of 1:0.6–1.2 at a temperature from 50°C to 150°C in the presence of a Lewis acid so as to form said α-chloro-β-(3,4-dihydroxyphenyl)-propionitrile or its corresponding O-protected derivative.

## 3,920,702

## ANTHRAQUINONE DYESTUFFS

**Friedrich Wilhelm Krock, Opladen, and Rutger Neeff, Leverkusen, both of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen-Bayerwerk, Germany**

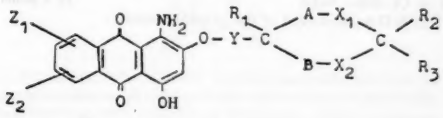
**Filed Aug. 9, 1973, Ser. No. 386,888**

**Claims priority, application Germany, Aug. 9, 1972, 2239108**

**Int. Cl.[2] C07D** *319/06, 317/28, 317/72*

**U.S. Cl. 260—340.7** **13 Claims**

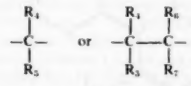
1. Anthraquinone dyestuff of the formula



in which

Y is a direct bond, $C_1$-$C_6$-alkylene, or $C_1C_6$-alkylene interrupted by oxygen, sulfur, or sulphone;

A is alkylene of the formula



B is a direct bond or an alkylene of the formula

with the proviso that B is a direct bond if A is

$R_1$, $R_4$, $R_5$, $R_6$, and $R_7$, independently of each other, are hydrogen, $C_1$–$C_5$-alkyl, or $C_1$–$C_5$-alkyl substituted by chloro, bromo, fluoro, hydroxy, $C_1$–$C_4$-alkoxy, phenoxy, phenyl-$C_1$–$C_2$-alkoxy, phenyl, or any of the last three named substituents further substituted by chloro, bromo, fluoro, $C_1$–$C_4$-alkyl or $C_1$–$C_4$-alkoxy;

$R_2$ and $R_3$, independently of each other are hydrogen, $C_1$–$C_5$-alkyl, or $C_1$–$C_5$-alkyl substituted cy $C_1$–$C_4$-alkoxy, $C_1$–$C_4$-alkyl mercapto, fluoro, chloro, bromo, $C_2$–$C_5$-alkylcarbonyl, $C_2$–$C_5$-alkoxycarbonyl, phenylcarbonyl, phenyl, phenoxy, benzyloxy, or any othe the last three named substituents further substituted by $C_1$–$C_4$-alkyl, $C_1$–$C_4$-alkoxy, chloro, fluoro, or bromo;

$R_2$ and $R_3$, when joined together are a nonaromatic carbocycle of 5–7 members or heterocycle of 5–7 members wherein the heterocycle is formed of not more than one heteroatom from the group consisting of oxygen and sulfur, with the remaining members of the heterocycle being carbon;

$X_1$ and $X_2$, independently of each other, are oxygen or sulfur; and

$Z_1$ and $Z_2$, independently of each other, are hydrogen, fluoro, chloro, or bromo.

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**3,920,703**

## D-HOMOSTEROID LACTONES

**Leo Alig, Liestal; Andor Fürst, Basel; Peter Keller, Therwil; Marcel Muller, Frenkendorf, all of Switzerland; Ulrich Kerb, and Rudolf Wiechert, both of Berlin, Germany, assignors to Hoffmann-La Roche Inc., Nutley, N.J.**

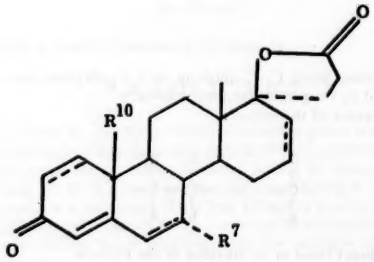
**Filed Sept. 23, 1974, Ser. No. 508,127**

**Claims priority, application Switzerland, Sept. 26, 1973, 13763/73**

**Int. Cl.[2] C07D** *307/94*

**U.S. Cl. 260—343.6** **16 Claims**

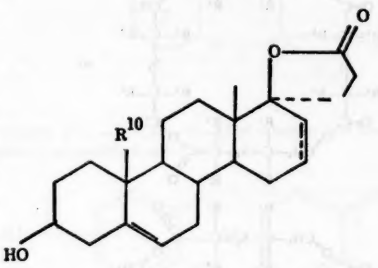
1. A D-homosteroid of the general formula



(I)

wherein the broken lines in the 1,2-,6,7- and 16,17-positions denote optional bonds, $R^{10}$ is a hydrogen atom or methyl when a single bond is present in the 1,2-position or methyl when a double bond is present in the 1,2-position and $R^7$ is hydrogen, mercapto, $C_{1-15}$-hydrocarbon acylthio or $C_{1-8}$ alkylthio when a single bond is present in the 6,7-position or hydrogen when a double bond is present in the 6,7-position.

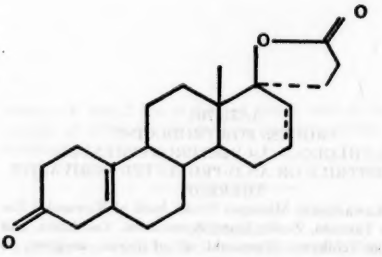
15. A compound of the formula



(II)

wherein $R^{10}$ represents a hydrogen atom or a methyl group when a single bond is present in the 1,2-position or a methyl group when a double bond is present in the 1,2-position.

16. A compound of the formula



(IV)

wherein the broken line in 16,17-position denotes an optional bond.

3,920,704

## N-SUBSTITUTED IMINOCOUMARIN DYES

**Dietmar Augart, Ludwigshafen; Wolfgang Mach, Hockenheim, and Horst Scheuermann, Ludwigshafen, all of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen (Rhine), Germany**

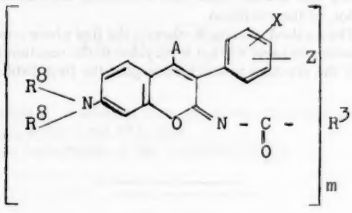
**Filed July 11, 1973, Ser. No. 378,065**

**Claims priority, application Germany, July 12, 1972, 2234207**

**Int. Cl.[2] C07D** *311/58*

**U.S. Cl. 260—345.2** **2 Claims**

**1.** A dye of the formula



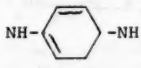
in which

*m* is one of the integers 1 and 2,

A is hydrogen or alkyl of 1 to 4 carbon atoms,

$R^8$ is alkyl of 1 to 4 carbon atoms,

$R^3$ is when $m = 1$ is alkyl of 1 to 4 carbon atoms, benzyl, phenyl, phenyl substituted by chloro, nitro, methyl or methoxy, vinyl, β-phenylvinyl, alkoxy of 1 to 4 carbon atoms, cyclohexyloxy, phenoxy, β-methoxyethoxy, amino, alkylamino of 1 to 4 carbon atoms, cyclohexylamino, benzylamino, phenylamino or phenylamino substituted by chloro, methyl or methoxy, $R^3$ when $m = 2$ is alkylene of 1 to 3 carbon atoms, phenylene, —O $CH_2CH_2O$—, —$CH_2O$ $CH_2$— or



X is cyano or nitro and

Z is hydrogen, cyano, chloro, bromo, methylsulfonyl sulfamoyl or nitro.

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3,920,705

## 6A,10A-TRANS-6A,10,10A-TETRAHYDRODIBENZO(B,D)-PYRANS

**Theodore Petrzilka, Rigistrasse 6, 8703 Erlenbach, Switzerland**

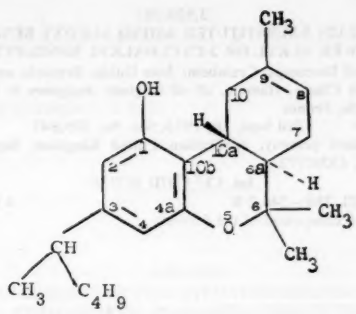
**Continuation-in-part of Ser. No. 52,079, July 2, 1970, abandoned, which is a continuation-in-part of Ser. No. 727,111, May 1, 1968, Pat. No. 3,560,528. This application Nov. 1, 1972, Ser. No. 302,829**

**Claims priority, application Switzerland, May 19, 1967, 7081/67**

**Int. Cl.[2] C07D** *311/80*

**U.S. Cl. 260—345.3** **3 Claims**

**1.** The (−)-antipode of a dibenzopyran of the formula



said dibenzopyran being is substantially pure form and being substantially free from its (+)-optical antipode.

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3,920,706

## LOW-FOAM SURFACTANTS RESISTANT TO ALKALIS

**Wolfgang Kindscher, Fussgoenheim; Karl-Heinz Beyer, Frankenthal, and Klaus Wulz, Ludwigshafen, all of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen (Rhine), Germany**

**Filed Jan. 17, 1974, Ser. No. 434,247**

**Claims priority, application Germany, Jan. 20, 1973, 2302876**

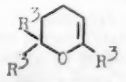
**Int. Cl.[2] C07C** *41/00*

**U.S. Cl. 260—345.9** **3 Claims**

**1.** A process for the manufacture of surfactants, in which a polyalkoxylated alcohol of formula I

is reacted with a vinyl ether of formula II or III

$CH_2$



(III)

in the presence of an alkaline-reacting agent selected from the group consisting of sodium hydroxide, potassium hydroxide, calcium hydroxide, magnesium hydroxide, sodium carbonate, potassium carbonate, sodium methoxide, sodium ethoxide, potassium t-butoxide, trimethylamine, triethylamine, tri-n-butylamine, tri-isopropylamine, triethanolamine and tri-isobutanolamine, wherein $R^1$ denotes a straight-chain or branched-chain, saturated or unsaturated alkyl radical of from 7 to 22 carvon atoms or a mononuclear or dinuclear alkylaryl radical having from 8 to 12 carbon atoms in the alkyl chain, $R^2$ denotes a straight-chain or branched-chain alkyl radical of from 1 to 10 carbon atoms or an optionally $C_{1-4}$ alkyl-substitued cyclohexyl radical, $R^3$ denotes hydrogen or a $C_{1-4}$ alkyl radical, *n* is an integer of from 1 to 30 and *m* is an integer of from 5 to 50, provided that the ratio of *m* to *n* is at least 1:1, said process being carried out at a temperature of from 0° to 100°C.

3,920,707

## CERTAIN 3-SUBSTITUTED AMINO ALKOXY BENZOYL--LOWER ALKYL OR 2-CYCLOALKYL BENZOFURANS

**Marcel Descamps, Crainhem; Jean Gubin, Brussels, and Norbert Claeys, Hamme, all of Belgium, assignors to Labaz, Paris, France**

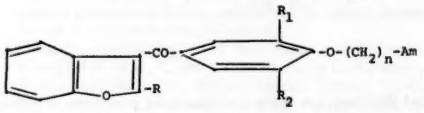
**Filed Sept. 10, 1973, Ser. No. 395,847**

**Claims priority, application United Kingdom, Sept. 19, 1972, 43387/72**

**Int. Cl.² C07D** *307/78*

**U.S. Cl. 260—346.2 R** **4 Claims**

**1.** A compound of the formula:



or a pharmaceutically acceptable acid addition salt thereof, wherein R represents branched- or straight-chain alkyl containing from 1 to 4 carbon atoms or cyclohexyl, $R_1$ and $R_2$, which are identical, each represent straight-chain alkyl containing from 1 to 3 carbon atoms, Am represents dimethylamino, diethylamino, di-n-propylamino, di-n-butylamino, piperidino, N-methyl-piperazino, N-ethyl-piperazino, N,n-propyl-piperazino, N-phenyl-piperazino, methyl-n-butylamino, ethyl-n-butylamino, methylamino, ethylamino, n-propylamino, isopropylamino or n-butylamino and n is an integer in the range of from 3 to 6 inclusive.

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3,920,708

## PROCESS FOR PREPARING GLYCIDOL

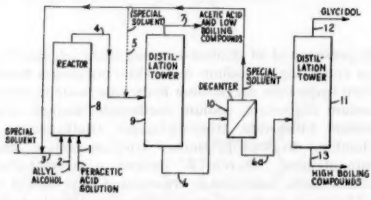
**Masayoshi Kubo; Yuji Nakazawa, and Katuhiko Takahashi, all of Saitama, Japan, assignors to Daicel Ltd., Osaka, Japan**

**Filed Dec. 14, 1973, Ser. No. 424,642**

**Claims priority, application Japan, Dec. 27, 1972, 47-1518**

**Int. Cl.² C07D** *303/14*

**U.S. Cl. 260—348.5 L** **10 Claims**




**1.** A process for producing glycidol, which comprises: reacting, in the liquid phase, allyl alcohol with a solution of peracetic acid dissolved in a first solvent selected from the group consisting of ethyl acetate and acetone, in the presence of a second organic solvent which is inert to peracetic acid and to glycidol, which has a boiling point higher than that of acetic acid and which separates from glycidol on cooling to a temperature of about 18° to 25°C or lower, the amount of said second solvent being from 10 volume percent to 100 volume percent, based on the combined volumes of allyl alcohol and said peracetic acid solution, whereby to produce a reaction product mixture consisting essentially of glycidol, acetic acid, said first solvent, said second solvent, low boiling compounds and high boiling compounds; distilling said reaction product mixture and removing acetic acid and compounds having lower boiling points than that of acetic acid, as the overhead, and recovering a heterogeneous liquid residue consisting essentially of glycidol, said second solvent and said high boiling compounds; cooling said liquid residue to a temperature of about 18° to 25°C or lower to separate same into a first phase containing said second solvent and a second phase containing glycidol and said high boiling compounds; and distilling said second phase and recovering substantially pure glycidol, as the overhead.

**8.** The method of claim **6** wherein the first phase comprising said second organic solvent is recycled to the reaction product before the reaction product undergoes the first distillation.

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3,920,709

## ACYLATED ANTHRAQUINONE DYESTUFFS

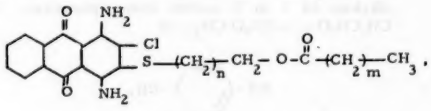
**Laszlo A. Meszaros, Charlotte, N.C., assignor to Martin Marietta Corporation, Rockville, Md.**

**Continuation-in-part of Ser. No. 306,898, Nov. 15, 1972, abandoned. This application Aug. 8, 1974, Ser. No. 495,674**

**Int. Cl.² C07C** *49/68*

**U.S. Cl. 260—376** **9 Claims**

**1.** A compound of the formula



wherein $n$ is 1 or 2, and $m$ is 0, 1, 2 or 3.

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3,920,710

## 2-NITRO-4-BENZENESULFONAMIDO CHLOROBENZENES

**Gregoire Kalopissis, Paris; Andree Bugaut, Boulogne-sur-Seine, and Vahan Zorayan, Enghien-les-Bains, all of France, assignors to L'Oreal, Paris, France**

**Division of Ser. No. 78,923, Oct. 7, 1970, Pat. No. 3,742,048, which is a division of Ser. No. 728,750, May 13, 1968, Pat. No. 3,617,164. This application Apr. 20, 1973, Ser. No. 352,994**

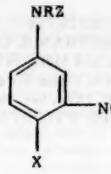
**Claims priority, application Luxemburg, May 16, 1967, 53676; May 16, 1967, 53677; May 16, 1967, 53678**

**Int. Cl.² C07C** *143/80*

**U.S. Cl. 260—397.7 R** **1 Claim**

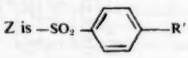
**1.** A compound selected from the group consisting of

a. a compound of the formula



wherein R is selected from the group consisting of lower alkyl having 1–6 carbon atoms, hydroxy alkyl having 1–6 carbon atoms and haloalkyl having 1–6 carbon atoms;

X represents chlorine; and



wherein R′ is selected from the group consisting of hydrogen, methyl and $NO_2$; and

b. the hydrohalide of the compound in (a).

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**3,920,711**

## UNSATURATED ETHERS AND THIOETHERS

**Hans-Peter Schelling, Oberwil, and Fritz Schaub, Basel both of Switzerland, assignors to Sandoz Ltd., Basel, Switzerland**

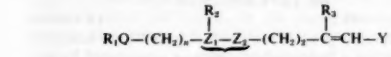
**Continuation-in-part of Ser. No. 257,671, May 30, 1972, abandoned. This application Dec. 19, 1973, Ser. No. 426,228**

**Claims priority, application Switzerland, June 2, 1971, 8036/71**

**Int. Cl.² C08H** *3/00;* **A01N** *9/24*

**U.S. Cl. 260—399** **7 Claims**

1. A compound of the formula:



wherein

$R_1$ is alkyl of 1 to 10 carbon atoms; alkenyl of 3 to 10 carbon atoms; alkynyl of 3 to 10 carbon atoms; cycloalkyl of 3 to 6 carbon atoms; cycloalkyl of 3 to 6 carbon atoms substituted by alkyl of 1 to 4 carbon atoms; cycloalkenyl of 5 to 7 carbon atoms; cycloalkenyl of 5 to 7 carbon atoms substituted by alkyl of 1 to 4 carbon atoms; cycloalkyl (of 3 to 6 carbon atoms) alkyl (of 1 to 4 carbon atoms); cycloalkyl (of 3 to 6 carbon atoms) alkyl (of 1 to 4 carbon atoms) ring substituted by alkyl of 1 to 4 carbon atoms) alkyl (of 1 to 4 carbon atoms); or cycloalkenyl (of 5 to 7 carbon atoms)alkyl (of 1 to 4 carbon atoms) alkyl ring substituted by alkyl of 1 to 4 carbon atoms;

$R_2$ and $R_3$, which are the same or different, are each hydrogen or alkyl of 1 to 4 carbon atoms,

Y is cyano;

$-CONR_4R_5$

wherein

$R_4$ and $R_5$, which are the same or different, are each hydrogen or alkyl of 1 to 4 carbon atoms, or $R_4$ and $R_5$ together with the nitrogen atom pyrrolidino, piperidino or merpholino

wherein

$R_6$ is alkyl of 1 to 5 carbon atoms; or

$COR_7$

wherein

$R_7$ is alkyl of 1 to 5 carbon atoms;

Q is oxygen or sulphur;

$-Z_1-Z_2-$ is $-CH-O-$ or $-CH-S-$;

and

$n$ is an integer 1, 2 or 3.

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**3,920,712**

## METAL SALTS OF BENZOYLOXYBENZOATES AND COMPOSITIONS STABILIZED THEREWITH

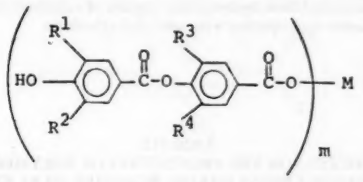
**John D. Spivack, Spring Valley, and John J. Luzzi, Carmel, both of N.Y., assignors to Ciba-Geigy Corporation, Ardsley, N.Y.**

**Filed May 14, 1973, Ser. No. 360,290**

**Int. Cl.² C07C** *63/33*

**U.S. Cl. 260—429 R** **13 Claims**

1. A benzoyloxybenzoate having the formula



wherein

$R^1$ and $R^2$ are (lower) alkyl or (lower) cycloalkyl groups,

$R^3$ and $R^4$ are hydrogen, (lower) alkyl or (lower) cycloalkyl,

M is selected from the group consisting of sodium, potassium, cadmium, zinc, barium, nickel, aluminum, tin, chromium, cobalt, manganese, iron, copper, titanium, vanadium and alkyltin, and

$m$ is an integer from 1 to 4, said integer being equal to the valency of M.

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**3,920,713**

## PROCESS FOR THE PRODUCTION OF ALKOXIDES OF MAGNESIUM AND ALUMINUM

**Hans Feichtinger, Dinslaken; Heinz Noeske, and Hans-Walter Birnkraut, both of Oberhausen, all of Germany, assignors to Ruhrchemie Aktiengesellschaft, Oberhausen-Holten, Germany**

**Filed Dec. 7, 1973, Ser. No. 422,973**

**Claims priority, application Germany, Dec. 15, 1972, 2261386**

**Int. Cl.² C07F** *5/06*

**U.S. Cl. 260—448 AD** **11 Claims**

1. A process for preparing a metal-free alkoxide of magnesium or aluminum which comprises reacting magnesium or aluminum with an alcohol containing 1–9 carbon atoms at a temperature of about 100°–200°C., and at a pressure of 5–20 atmospheres gauge of hydrogen, in the absence of a catalyst, the reaction being conducted in the presence of a liquid hydrocarbon selected for the group consisting of aliphatic, cycloaliphatic and aromatic hydrocarbons and mixtures thereof, and recovering said alkoxide.

3,920,714

## PROCESS FOR THE PRODUCTION OF POLYMERIC HYDROCARBONS WITH REACTIVE SILYL SIDE GROUPS

Roland Streck, assignor to Heinrich Weber, both of Marl, Germany and Chemische Werke Huels Aktiengesellschaft, Marl, Germany

Continuation-in-part of Ser. No. 306,989, Nov. 16, 1972, Pat. No. 3,857,825. This application Mar. 19, 1974, Ser. No. 452,663

Claims priority, application Germany, Mar. 23, 1973, 2314543

Int. Cl.[2] C07F 7/08, 7/18

U.S. Cl. 260—448.2 E 11 Claims

1. A process for preparing polymeric hydrocarbons having hydrolyzable silyl side groups non-terminally substituted along the polymer backbone, which comprises metathetically reacting

a. a silylcycloolefin capable of being polymerized under ring opening and having at least one hydrolyzable silyl group substituted on the cycloolefin skeleton at a carbon atom other than the carbon atoms forming the olefinic bond; with at least one of

b. a polymeric hydrocarbon having at least one unbranched double bond in the polymer backbone, or

c. a cycloolefinic hydrocarbon capable of copolymerization under ring opening with said silylcycloolefin.

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3,920,715

## PROCESS FOR THE PRODUCTION OF POLYMERIC HYDROCARBONS HAVING REACTIVE SILYL END GROUPS

Roland Streck, and Heinrich Weber, both of Marl, Germany, assignors to Chemische Werke Huels Aktiengesellschaft, Marl, Germany

Division of Ser. No. 306,989, Nov. 16, 1972, Pat. No. 3,857,825. This application Oct. 1, 1974, Ser. No. 510,888

Claims priority, application Germany, Nov. 19, 1971, 2157405

Int. Cl.[2] C07F 7/08, 7/18

U.S. Cl. 260—448.2 E 33 Claims

1. A process for preparing polymers having reactive silyl end groups, which comprises reacting:

a. a polymer having at least one metathetical unsubstituted, ethylenically unsaturated double bond in the polymer chain;

b. about 0.001–1.0 mole per mole of said polymer of a tetrasubstituted organic silicon compound consisting essentially of

i. at least one metathetically reactive organic group having at least one unsubstituted, ethylenically unsaturated, non-conjugated, acyclic double bond, which group is bonded to silicon via a carbon-silicon bond;

ii. at least one hydrolyzable group bonded to a silicon atom via a carbon-silicon bond, selected from the group consisting of halogen, lower alkoxy, lower alkanoyloxy, carbocyclic aroyloxy of 6–12 carbon atoms and lower ketoxime, and

iii. any remaining silicon valences bearing a carbon-silicon bond; in the presence of

c. a catalytic amount of a cycloolefin metathesis catalyst comprising:

i. a halogenated compound of a metal in Subgroups 5–7 of the Mendeleyeev Periodic Table; and

ii. a metal, metal alkyl or metal hydride of a metal in Main Groups 1–3 of the Mendeleyeev Periodic Table;

in a reaction media substantially free of conjugated diolefins, alkines, water and H-acidic compounds, at a temperature of about −50° C. to +80° C. to form a polymeric hydrocarbon chain having reactive silyl end groups.

3,920,716

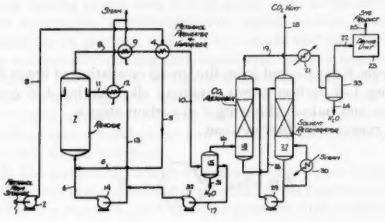
## LIQUID PHASE METHANOL GASIFICATION

Peter H. Spitz, Hartsdale, and Marshall E. Frank, Chappaqua, both of N.Y., assignors to Chem Systems, New York, N.Y.

Filed Mar. 29, 1974, Ser. No. 456,067

Int. Cl.[2] C07C 27/06

U.S. Cl. 260—449 M 6 Claims



1. A process for the conversion of methanol to methane which comprises: passing methanol into a reaction zone containing a suspension of a methanation catalyst in an insert fluidizing medium; upwardly flowing said fluidizing medium in said reaction zone so as to expand the volume of catalyst by at least 5% at a temperature of from 225° to 500° C., said fluidizing medium being in the liquid phase and capable of dissolving from 0.1 to 10 wt.% of water under the reaction conditions; converting substantially all of the methanol feed to the reaction zone; removing from said reaction zone a gaseous product containing methane and having less than 1.7 mole % (on a dry basis) of carbon monoxide.

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3,920,717

## PRODUCTION OF METHANOL

Charles P. Marion, Mamaroneck, N.Y., assignor to Texaco Development Corporation, New York, N.Y.

Filed Mar. 26, 1973, Ser. No. 345,144

Int. Cl.[2] C07C 29/16

U.S. Cl. 260—449.5 18 Claims

1. A continuous process for producing methanol comprising: (1) reacting a hydrocarbonaceous or oxygenated hydrocarbonaceous feedstock by partial oxidation with a free-oxygen containing gas and optionally in the presence of a temperature moderator selected from the group consisting of $H_2O$, $CO_2$, $N_2$, flue gas, cooled off gas from an ore-reduction zone, a portion of cooled and recycled effluent gas from the synthesis gas generator, and mixtures thereof at an autogenous temperature in the range of about 1600° to 3500°F and a pressure in the range of about 20 to 450 atmospheres in the reaction zone of a free-flow unpacked noncatalytic synthesis gas generator to produce an effluent gas stream comprising $H_2$, CO, $CO_2$, and $H_2O$ and in mole % $H_2S$, 0–2; COS, 0–0.2; $CH_4$, 0.2–15; A, 0–2.0; $N_2$, 0–60; and entrained solids and ash; (2) removing entrained solids and ash from the effluent gas stream from (1) and introducing said gas stream in admixture with about 0.1 to 2.5 moles of supplemental steam per mole of effluent gas stream into a separate free-flow unpacked reaction zone at a pressure substantially that in said synthesis gas generator less ordinary line drop and at a temperature of at least 1500°F and reacting together $H_2O$ and CO in said mixture without a catalyst thereby increasing the mole ratio ($H_2$/CO) of the gas stream to a value in the range of about greater than 2.0 to 12; (3) cooling the effluent gas stream from (2) by indirect heat exchange with water thereby producing steam, optionally introducing a first portion of said steam into the synthesis gas generator in (1) as the $H_2O$ temperature moderator, optionally mixing a second portion of said steam with the effluent stream in step (2) as said supplemental steam, and optionally introducing other portions of said steam into at least one steam turbine in the system as the working fluid; (4) intoducing the effluent gas stream from (3)

into a gas purification zone and separating therefrom a process gas stream comprising principally $H_2$ and CO; (5) mixing 0 to 10 moles of a compressed recycle stream of unconverted gases produced subsequently in a methanol reaction zone with each mole of process gas stream from (4) to produce a methanol feed gas mixture; (6) preheating the methanol feed gas mixture from (5) to a temperature in the range of about 400° to 750°F by indirect heat exchange with an effluent stream leaving said methanol reaction zone; (7) introducing the preheated feed gas stream from (6) into said methanol reaction zone, and reacting together $H_2$ and CO while in contact with a methanol catalyst at substantially the same pressure as that in said synthesis gas generator less ordinary drop in the line and equipment to produce said effluent stream from the methanol reaction zone comprising methanol, unconverted gases, $H_2O$, and liquid impurities selected from the group consisting of dimethylether, mixed alcohols, aldehydes, ketones, and mixtures thereof, (8) separating a separate stream of said unconverted gases from the effluent stream from the methanol reaction zone; (9) compressing at least a portion of the stream of unconverted gases from (8) and introducing said stream into (5) as said compressed stream of unconverted gases; (10) separating said liquid impurities and a separate stream of methanol from the effluent stream from the methanol reaction zone; and (11) introducing at least a portion of said liquid impurities into said synthesis gas generator in (1) as at least a portion of said feedstock.

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## 3,920,718
## METHOD OF MAKING α,α-DIFLUOROISOCYANATES

**James E. Nottke, Greenville, N.C., assignor to E. I. Du Pont de Nemours & Co., Wilmington, Del.**

**Filed July 22, 1974, Ser. No. 490,339**
**Int. Cl.² C07C *118/00***
**U.S. Cl. 260—453 P** **4 Claims**

1. In the manufacture of an α,α-difluoroisocyanate of the formula $RCF_2NCO$ by the reaction of an organic nitrile of the formula RCN with carbonyl fluoride wherein R is an alkyl, cycloalkyl, aryl, or aralkyl group containing up to 20 carbon atoms and which can be substituted with F, Cl, or Br, the improvement comprising conducting the reaction at a temperature of about 50°–250°C. in the presence of a catalytic amount of mercuric oxide or mercuric fluoride.

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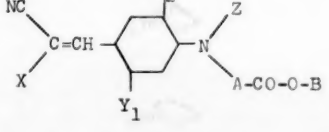
## 3,920,719
## WATER-INSOLUBLE STYRYL DYESTUFFS

**Nalin Binduprasad Desai, Goregaon-Bombay, India, and Walter Jenny, Basel, Switzerland, assignors to Ciba-Geigy AG, Basel, Switzerland**

**Continuation-in-part of Ser. No. 28,533, April 14, 1970, abandoned. This application Mar. 15, 1973, Ser. No. 341,668**
**Claims priority, application Switzerland, Apr. 24, 1969, 6355/69**
**Int. Cl.² C07C *121/78***
**U.S. Cl. 260—465 D** **7 Claims**

1. A water-insoluble styryl dyestuff of the formula




wherein X is cyano, phenylsulfonyl, $C_1$–$C_4$-carbalkoxy or $C_1$–$C_4$-carbamyl; B is unsubstituted phenyl or phenyl substituted by lower alkyl, lower alkoxy, chlorine and/or nitro; A is $C_1$–$C_3$-alkylene; $Y_1$ and $Y_2$ each represents hydrogen, alkyl or alkoxy containing up to 2 carbon atoms; Z is unsubstituted $C_1$–$C_4$-alkyl, $C_1$–$C_4$-alkyl substituted by phenyl, chlorine, cyano, phenoxy, cyanoethoxy, $C_1$–$C_4$-alkoxy, hydroxy, $C_1$–$C_4$-alkoxycarbonyl, $C_1$–$C_4$-alkylcarbonyloxy, benzoyloxy, $C_1$–$C_4$-alkylcarbonylamino, acetyl or a radical of the formula A—CO—O—B.

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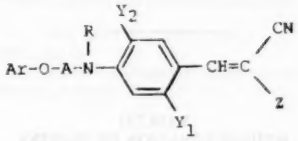
## 3,920,720
## STYRYL DYESTUFFS

**Hermann Beecken, Schildgen, Germany, assignor to Bayer Aktiengesellschaft, Leverkusen-Bayerwerk, Germany**

**Filed Apr. 3, 1974, Ser. No. 457,616**
**Claims priority, application Germany, Apr. 4, 1973, 2316766**
**Int. Cl.² C07C *121/78***
**U.S. Cl. 260—465 E** **10 Claims**

1. Styryl dyestuffs of the formula




wherein

Ar is selected from the group consisting of

a. phenyl which contains at least one substituent of the group consisting of unsubstituted $C_{3-12}$alkyl; unsubstituted $C_{5-7}$ cycloalkyl; unsubstituted phenyl $C_{1-3}$ alkyl; methyl, chloro, benzyl, benzyloxy, or naphthyl substituted phenyl $C_{1-3}$ alkyl; unsubstituted $C_{1-12}$alkylmercapto; unsubstituted $C_{5-7}$ cycloalkylmercapto; unsubstituted phenyl $C_1$ to $C_3$ -alkylmercapto; chloro substituted phenyl $C_1$ to $C_3$ alkylmercapto; unsubstituted phenylmercapto; chloro, methyl, propyl, butyl, benzyl, phenyl, phenoxy or cyclohexyl substituted phenylmercapto; unsubstituted naphthyl mercapto; unsubstituted tetrahydronaphthyl mercapto; or a heterylmercapto substituent selected from the group unsubstituted benzthiazolyl mercapto; methyl, ethoxy, or cyclohexyl substituted benzthiazolyl mercapto; unsubstituted naphthothiazolyl; unsubstituted benzoxazolyl; or styryl and wherein the phenyl ring may optionally contain substituents of the group H, $CH_3$, $C_2H_5$, Cl, OH, phenoxy or phenyl;

b. a naphthalene or 5,6,7,8-tetrahydronaphthalene radical which can be substituted by 1–2 propyl, isopropyl, butyl, isobutyl, tert.-butyl, isoamyl, isooctyl, lauryl, cyclopentyl, cyclohexyl, bicyclo[2.2.1]hept-2-yl, benzyl, $C_1$- to $C_4$-alkylmercapto, benzylmercapto or phenylmercapto groups and/or 1–2 halogen atoms; or

c. trichlorophenyl, tetrachlorophenyl, methyltetrachlorophenyl or pentachlorophenyl and

A represents an unsubstituted $C_2$ to $C_4$-alkylene group

R denotes an unsubstituted $C_1$ to $C_4$-alkyl group; a $C_1$ to $C_4$ -alkyl group substituted by CN, ethoxy, phenoxy, or tolyloxy; unsubstituted $C_5$ to $C_7$-cycloalkyl; unsubstituted phenyl $C_1$ to $C_3$-alkyl; or methyl, butyl or chloro substituted phenyl $C_1$ to $C_3$-alkyl group; $Y_1$ and $Y_2$ denote H, unsubstituted $C_{1-4}$ alkyl, unsubstituted $C_1$ to $C_4$-alkoxy, phenoxy, halogen, $C_2$ to $C_3$-alkanoylamino, benzoylamino or phenyl; and

Z is CN, $SO_2Q$, $COQ^1$, $CO_2Q^2$.

wherein

Q is unsubstituted $C_{1-4}$ alkyl, unsubstituted $C_5$ to $C_7$-cycloalkyl, unsubstituted phenyl, butyl substituted phenyl, or unsubstituted naphthyl;

$Q^1$ is unsubstituted $C_{1-4}$ alkyl, unsubstituted $C_5$ to $C_7$-cycloalkyl, unsubstitued phenyl, or unsubstituted naphthyl;

$Q^2$ is unsubstituted $C_{1-4}$ alkyl; cyano, chloro, methoxy, methoxycarbonyl, phenoxy, chlorophenoxy, methylphenoxy, butylphenoxy, naphthyl or cyclohexylphenoxy substituted $C_{1-4}$ alkyl; unsubstituted $C_5$ to $C_7$-cycloalkyl; unsubstituted phenyl $C_1$ to $C_3$-alkyl; chloro substituted phenyl $C_1$ to $C_3$-alkyl; phenylallyl; or unsubstituted naphthyl; and

$W^1$ and $W^2$ are H; unsubstituted $C_{1-4}$ alkyl; cyano substituted $C_{1-4}$ alkyl; unsubstituted $C_5$ to $C_7$-cycloalkyl; unsubstituted phenyl; chloro, ethoxy, or butyl substituted phenyl; or unsubstituted naphthyl; or $W^1$ and $W^2$ togoether form a piperidine or pyrrolidine ring.

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## 3,920,721
## HYDROCYANATION OF OLEFINS

**Lawrence Wayne Gosser, Wilmington, Del., assignor to E. I. Du Pont de Nemours & Company, Wilmington, Del.**

**Filed Sept. 18, 1974, Ser. No. 507,218**
**Int. Cl.² C07C** *120/02*
**U.S. Cl. 260—465.8 R** **11 Claims**

1. The method of hydrocyanating olefins which comprises mixing together

1. an olefinically unsaturated compound of 2 to 20 carbon atoms selected from the group consisting of hydrocarbons having one or two aliphatic carbon-carbon double bonds, and substituted hydrocarbons having 1–4 substituents selected from the group consisting of cyano, formyl, lower alkoxycarbonyl, lower alkylcarbonyl, and arylcarbonyl which are isolated from the carbon-carbon double bond by at least one carbon,
2. hydrogen cyanide,
3. 0.0002 to 0.5 mole, per mole of olefin, of a ligand-complexed cobalt compound of the formula

$$[(YO)_3P]_{4-x}\,CoHL_x \text{ or } [(YO)_3P]_3Co[C_6R_4OP(OY)_2]$$

in which

a. the Y's, alike or different, are phenyl or phenyl substituted with lower alkyl, lower alkoxy, lower alkylcarbonyl, nitrile, or phenyl;

b. the L's, alike or different, are a ligand of the formula $R^1(CN)_n$, where $n$ is 1 or 2; when $n$ is 1, $R^1$ is a hydrocarbyl of 1–18 carbon atoms selected from the group consisting of alkyl, alkenyl, aryl or alkaryl; and when $n$ is 2, $R^1$ is a hydrocarbylene of 1–8 carbon atoms selected from the group consisting of alkylene, alkenylene, arylene and alkarylene;

c. x is an integer from 0 to 2; and

d. the R's, alike or different, are hydrogen or lower alkyl, and

4. a nonoxidizing Lewis acid promoter in a mole ratio of promoter to cobalt compound of 1:16 to 20:1,

in the absence of an oxidizing agent for the cobalt compound and allowing the reaction to take place at a temperature of −25°C. to 200°C whereby hydrogen cyanide is added to an olefinically unsaturated carbon-carbon double bond.

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## 3,920,722
## OLIGOMERIZATION PROCESS

**John E. Mahan, and Lloyd E. Gardner, both of Bartlesville, Okla., assignors to Phillips Petroleum Company, Bartlesville, Okla.**

**Filed June 24, 1974, Ser. No. 482,255**
**Int. Cl.² C07C** *120/00, 121/20*
**U.S. Cl. 260—465.8 D** **7 Claims**

1. A process for producing a mixture of 2-methyleneglutaronitrile and 2,4,6-tricyano-1-hexene which consists essentially of catalytically reacting acrylonitrile in the presence of a catalyst system consisting of (A) the zinc or cobalt salt of trifluoromethanesulfonic acid and (B) a trialkylamine wherein each alkyl, individually, has from 1 to 8 carbon atoms, under conditions of temperature and pressure sufficient to maintain said nitrile in the liquid phase.

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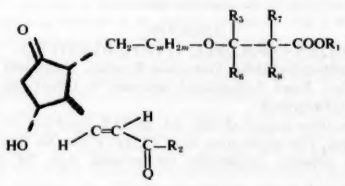
## 3,920,723
## 4-OXAPROSTAGLANDIN E-TYPE COMPOUNDS

**Norman A. Nelson, Galesburg, Mich., assignor to The Upjohn Company, Kalamazoo, Mich.**

**Continuation of Ser. No. 332,201, Feb. 13, 1973, abandoned, which is a continuation-in-part of Ser. No. 272,444, July 17, 1972, abandoned, which is a continuation-in-part of Ser. No. 47,169, June 17, 1970, abandoned. This application Apr. 17, 1974, Ser. No. 461,543**
**Claims priority, application United Kingdom, July 19, 1969, 38073/69**
**Int. Cl.² C07C** *61/38, 69/71*
**U.S. Cl. 260—468 D** **70 Claims**

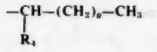
1. An optically active compound of the formula:



or a racemic compound of that formula and the mirror image thereof, wherein $C_mH_{2m}$ is alkylene of one to 9 carbon atoms, inclusive, with one to 4 carbon atoms, inclusive, between —$CH_2$— and —O—; wherein Q is

or

wherein $R_3$ is hydrogen or methyl; wherein $R_1$ is hydrogen, alkyl of one to 4 carbon atoms, inclusive, cycloalkyl of 3 to 10 carbon atoms, inclusive, aralkyl of 7 to 12 carbon atoms, inclusive, phenyl, phenyl substituted with one, 2, or 3 chloro or alkyl of one to 4 carbon atoms, inclusive, or ethyl substituted in the $\beta$-position with 3 chloro; wherein $R_2$ is



wherein $R_4$ is hydrogen or fluoro and g is one, 2, 3, 4, or 5; and wherein $R_5$, $R_6$, $R_7$, and $R_8$ are hydrogen or alkyl of one to 4 carbon atoms, inclusive; including the lower akanoates thereof, and the pharmacologically acceptable salts thereof, when $R_1$ is hydrogen.

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3,920,724

## 4-OXA PROSTAGLANDIN F $\alpha$-TYPE COMPOUNDS

Norman A. Nelson, Galesburg, Mich., assignor to The Upjohn Company, Kalamazoo, Mich.

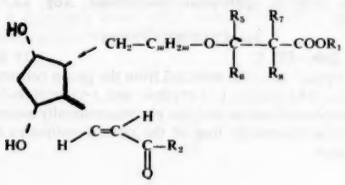
Continuation of Ser. No. 332,067, Feb. 13, 1973, abandoned, which is a continuation-in-part of Ser. No. 47,169, June 17, 1970, abandoned. This application Apr. 17, 1974, Ser. No. 461,583

Claims priority, application United Kingdom, July 29, 1969, 38073/69; June 15, 1970, 160488/70; June 16, 1970, 4099/70; Australia, June 18, 1970, 16530/70; Belgium, July 29, 1970, 92177; Denmark, July 28, 1970, 3917/70; France, July 28, 1970, 70.27783; Germany, July 23, 1970, 2036471

Int. Cl.[2] C07C *61/38, 69/74*

U.S. Cl. 260—468 D 70 Claims

1. An optically active compound of the formula:

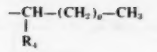


or a racemic compound of that formula and the mirror image thereof, wherein $C_mH_{2m}$ is alkylene of one to 9 carbon atoms, inclusive, with one to 4 carbon atoms, inclusive, between —$CH_2$— and —O—; wherein Q is



or

wherein $R_3$ is hydrogen or methyl; wherein $R_1$ is hydrogen, alkyl of one to 4 carbon atoms, inclusive, cycloalkyl of 3 to 10 carbon atoms, inclusive, aralkyl of 7 to 12 carbon atoms, inclusive, phenyl, phenyl substituted with one, 2, or 3 chloro or alkyl of one to 4 carbon atoms, inclusive, or ethyl substituted in the $\beta$-position with 3 chloro; wherein $R_2$ is



wherein $R_4$ is hydrogen or fluoro and g is one, 2, 3, 4, or 5; wherein $R_5$, $R_6$, $R_7$, and $R_8$ are hydrogen or alkyl of one to 4 carbon atoms, inclusive; including the lower alkanoates thereof, and the pharmacologically acceptable salts thereof, when $R_1$ is hydrogen.

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3,920,725

## BIOLOGICALLY ACTIVE COMPOUNDS

Derek Richard Buckle, Redhill, and Harry Smith, Horsham, both of England, assignors to Beecham Group Limited, England

Filed Oct. 24, 1973, Ser. No. 409,164

Claims priority, application United Kingdom, Nov. 11, 1972, 52203/72

Int. Cl.[2] C07C *69/02, 69/12*

U.S. Cl. 260—468 G 7 Claims

1. The compound 5,6-dimethyl-2-nitro cis-3a,4,7,7a-tetrahydroindane-1,3-dione.

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3,920,726

## $PGF_3$ ANALOGS

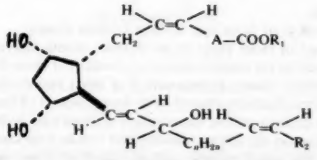
Udo F. Axen, Comstock, Mich., assignor to The Upjohn Company, Kalamazoo, Mich.

Continuation-in-part of Ser. No. 112,032, Feb. 2, 1971, Pat. No. 3,775,462, which is a continuation-in-part of Ser. No. 30,312, April 20, 1970, abandoned. This application Nov. 5, 1973, Ser. No. 412,687

Int. Cl.[2] C07C *61/38, 69/74*

U.S. Cl. 260—468 D 13 Claims

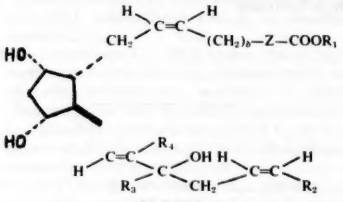
1. A racemic mixture of a compound of the formula:



and its mirror image wherein, $R_1$ is hydrogen, alkyl of one to 8 carbon atoms, inclusive, cycloalkyl of 3 to 10 carbon atoms, inclusive, aralkyl of 7 to 12 carbon atoms, inclusive, phenyl, phenyl substituted with one to 3 chloro or alkyl of one to 4 carbon atoms, inclusive, or $\beta,\beta,\beta$-trichloroethyl; wherein $R_2$ is alkyl of one to 4 carbon atoms, inclusive, substituted with zero to 3 fluoro; wherein n is an integer of one to 4, inclusive; wherein A is alkylene of one to 10 carbon atoms, inclusive, substituted with zero to 2 fluoro, and with one to 5 carbon atoms, inclusive, between —$COOR_1$ and

or a pharmacologically acceptable salt thereof when $R_1$ is hydrogen.

**8.** An optically active compound of the formula:



or a racemic compound of that formula and the mirror image thereof, wherein $R_1$ is hydrogen, alkyl of one to 8 carbon atoms, inclusive, cycloalkyl of 3 to 10 carbon atoms, inclusive, aralkyl of 7 to 12 carbon atoms, inclusive, phenyl, phenyl substituted with one, 2, or 3 chloro or alkyl of one to 4 carbon atoms, inclusive, or $\beta,\beta,\beta$-trichloroethyl; wherein $R_2$ is alkyl of one to 4 carbon atoms, inclusive, substituted with zero to 3 fluoro; wherein $R_3$ and $R_4$ are hydrogen or alkyl of one to 4 carbon atoms, inclusive; wherein Z is ethylene substituted by one or 2 fluoro; wherein b is zero, one, 2, or 3; or a pharmacologically acceptable salt thereof when $R_1$ is hydrogen.

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**3,920,727**

## NOVEL N-ARYLCARBAMIC ACID ESTERS

**Carl Metzger, Wuppertal-Vohwinkel; Gerhard Jäger, Wuppertal-Elberfeld, and Klaus Lürssen, Koenigsdorf, all of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany**

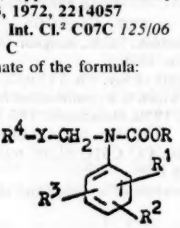
**Filed June 23, 1972, Ser. No. 265,909**

**Claims priority, application Germany, June 23, 1971, 2131028; Mar. 23, 1972, 2214057**

**Int. Cl.² C07C** *125/06*

**U.S. Cl. 260—471 C** **19 Claims**

**1.** N-arylcarbamate of the formula:



wherein

R is alkyl of from one to four carbon atoms;

alkenyl of from three to six carbon atoms; alkynyl of from three to six carbon atoms; cycloalkyl of from five to eight carbon atoms; hydroxyalkyl of from two to four carbon atoms; hydroxyalkenyl or hydroxyalkynyl of from three to six carbon atoms; alkoxyalkyl of from one to four carbon atoms in the alkoxy moiety and two to four carbon atoms in the alkyl moiety; chloro alkyl of from one to four carbon atoms and one to three chlorine atoms; chloroalkenyl or chloroalkynyl of from three to six carbon atoms and one to three chlorine atoms; or aralkyl of from one to four carbon atoms in the alkyl moiety and six to 10 carbon atoms in the aryl moiety wherein the aryl moiety may carry at least one of fluorine, chlorine, and bromine, alkyl of from one to four carbon atoms, chloroalkyl of from one to four carbon atoms and one to three chlorine atoms, alkoxy of from up to 4 carbon atoms and nitro;

$R^1$, $R^2$ and $R^3$ are individually selected from the group consisting of hydrogen, fluorine, chlorine, bromine, alkyl of from one to four carbon atoms, cycloalkyl of from five to seven carbon atoms, alkoxy of from one to four carbon atoms, chloroalkyl of from one or two carbon atoms and two to five chlorine atoms;

$R^4$ is the grouping

wherein

$R^{4'}$ is hydrogen, alkyl of from one to 17 carbon atoms; alkenyl of from three to 10 carbon atoms; alkynyl of from three to six carbon atoms; chloroalkyl of from one to six carbon atoms and one to three chlorine atoms; chloroalkenyl of from three to six carbon atoms and one to four chlorine atoms; chloroalkynyl of from three to six carbon atoms and one to four chlorine atoms; or alkoxyalkyl, alkylthioalkyl methylcarbonylalkyl, methoxycarbonylalkyl of from one to four carbon atoms per alkyl moiety; cycloalkyl of from three to eight carbon atoms, cycloalkenyl of from five to six carbon atoms; aryl, aralkyl, or aroxyalkyl of from six to 10 carbon atoms in the aryl moiety and one to four carbon atoms in the alkyl moiety, wherein said aryl moiety may carry at least one of fluorine, chlorine and bromine, alkyl or alkoxy of from one to four carbon atoms and chloroalkyl of from one or two carbon atoms and one to five chlorine atoms, and wherein the alkyl moiety of said aralkyl may be substituted with chlorine and

Y and Y′ are oxygen.

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**3,920,728**

## SEPARATION AND RESOLUTION OF ISOMERIC FORMS OF 3-(3,4-DIHYDROXY-PHENYL)-SERINE

**Balthasar Hegedüs, Binningen, and Anna Krasso, Basel, both of Switzerland, assignors to Hoffmann-La Roche Inc., Nutley, N.J.**

**Filed July 30, 1974, Ser. No. 493,013**

**Claims priority, application Switzerland, Aug. 22, 1973, 12056/73**

**Int. Cl.² C07C** *125/06*

**U.S. Cl. 260—471 C** **21 Claims**

**1.** An optical antipode selected from the group consisting of (−)-threo-, (+)-threo-, (−)-erythro and (+)-erythro-3-(3,4-dihydroxyphenyl)-serine and the pharmaceutically acceptable salts thereof essentially free of the optical antipodes of the reverse sign.

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**3,920,729**

## ISOPROPANOLAMINE ESTERS OF 3-[3,5 DI-T-BUTYL-4-HYDROXYPHENYL]PROPANOIC ACID

**Seiji Sagawa, Kawachinagano; Hiroyasu Itoi, Ibaragi; Kazuhiko Fujiyoshi, Toyonaka, and Kazuyoshi Kagaya, Ibaragi, all of Japan, assignors to Sumitomo Chemical Company, Ltd., Osaka, Japan**

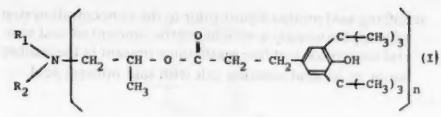
**Filed May 6, 1974, Ser. No. 467,229**

**Claims priority, application Japan, May 29, 1973, 48-60466; May 10, 1973, 48-52260**

**Int. Cl.² C07C** *69/76*

**U.S. Cl. 260—473 S** **3 Claims**

**1.** A compound of the formula,



wherein $n$ is an integer of 1 to 3; $R_1$ is hydrogen or alkyl having one to 18 carbon atoms and $R_2$ is alkyl having one to 18 carbon atoms provided that when $n$ is 2, $R_2$ is not present and when $n$ is 3, both $R_1$ and $R_2$ are not present.

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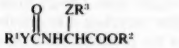
**3,920,730**
**SUBSTITUTED GLYCINES**
**John G. Gleason, Cornwall Heights, Pa.; Kenneth G. Holden, Haddonfield, N.J., and Nelson C. F. Yim, Philadelphia, Pa., assignors to Smithkline Corporation, Philadelphia, Pa.**
**Filed Feb. 28, 1974, Ser. No. 447,468**
**Int. Cl.[2] C07C** *125/06*
**U.S. Cl. 260—482 C** **5 Claims**

**1.** A compound of the formula:



where:

$R^1$ is lower alkyl of one to four carbon atoms, $\beta,\beta,\beta$-trichloroethyl, benzyl, p-nitrobenzyl or p-methoxybenzyl;

Y is O;

$R^2$ is hydrogen lower alkyl, halo(lower)-alkyl, benzyl, p-nitrobenzyl or p-methoxybenzyl;

Z is

and

$R^3$ is lower alkyl of one to four carbon atoms; phenyl or benzyl, the phenyl or benzyl group being unsubstituted or substituted with lower alkyl, lower alkoxy, hydroxy, halo, nitro or amino.

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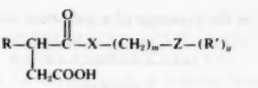
**3,920,731**
**DETERGENT COMPOUNDS**
**Appaya Raghunath Naik, Birkenhead, England, assignor to Lever Brothers Company, New York, N.Y.**
**Filed Aug. 29, 1974, Ser. No. 501,938**
**Claims priority, application United Kingdom, Sept. 14, 1973, 43191/73**
**Int. Cl.[2] C07C** *101/20, 103/30, 135/02*
**U.S. Cl. 260—485 H** **2 Claims**

**1.** Chemical compounds of the formula

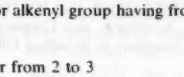


wherein

R is an alkyl or alkenyl group having from 10 to 18 carbon atoms

x is —O—

$m$ is an integer from 2 to 3



$R^1$ is an alkyl group having from one to three carbon atoms, the groups being the same or different

$y$ is 2 when Z is amine oxide and 3 when Z is a quaternary nitrogen atom and the salts of the betaines.

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**3,920,732**
**PROCESS FOR STABILIZED ETHYLENICALLY UNSATURATED BETA-HYDROXY ESTERS**
**Sol B. Radlove, Chicago, Ill., assignor to Continental Can Company, Inc., New York, N.Y.**
**Continuation of Ser. No. 306,106, Nov. 13, 1972, abandoned, which is a continuation-in-part of Ser. No. 242,777, April 10, 1972, abandoned. This application May 24, 1974, Ser. No. 473,036**
**Int. Cl.[2] C01C** *69/54*
**U.S. Cl. 260—486 B** **7 Claims**

**1.** In the method of preparing an ethylenically unsaturated beta-hydroxy ester susceptible of polymerization by ultraviolet radiation wherein a mixture of a polyepoxide having at least two epoxide groups in the polyepoxide molecule and an alpha, beta-ethylenically unsaturated carboxylic acid having three to six carbon atoms is reacted in the presence of an alkaline catalyst, wherein the improvement comprises incorporating in the mixture a small but effective amount of a tin halide salt to prepare the beta-hydroxy ester which is stable to premature gelation.

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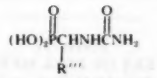
**3,920,733**
**UREIDOALKYLPHOSPHONIC ACIDS**
**Gail H. Birum, Kirkwood, Mo., assignor to Monsanto Company, St. Louis, Mo.**
**Filed Aug. 6, 1973, Ser. No. 385,931**
**Int. Cl.[2] C07F** *9/38*
**U.S. Cl. 260—502.5** **4 Claims**

**1.**



where

$R'''$ is alkyl of one to 15 carbon atoms.

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**3,920,734**
**PROCESS FOR THE PREPARATION OF AROMATIC CARBOXYLIC ACIDS**
**Yataro Ichikawa, and Teizo Yamaji, both of Iwankuni, Japan, assignors to Teijin Limited, Osaka, Japan**
**Filed Aug. 7, 1973, Ser. No. 386,432**
**Claims priority, application Japan, Aug. 10, 1972, 47-79434**
**Int. Cl. C07c** *63/06, 63/38*
**U.S. Cl. 260—515 R** **14 Claims**

**1.** A process for preparing aromatic carboxylic acids which comprises contacting an aromatic compound having at least one hydrogen atom attached to a nuclear carbon atom, with carbon monoxide and a member selected from the group consisting of molecular oxygen and a molecular oxygen-con-

taining gas, in the presence of a palladium carboxylate as a catalyst.

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**3,920,735**

## ZIRCONIUM ENHANCED ACTIVITY OF TRANSITION METAL-BROMINE CATALYSIS OF DI- AND TRIMETHYL BENZENE OXIDATION IN LIQUID PHASE

**Gene L. Wampfler, Lombard, and Gregory E. Croft, Oak Park, both of Ill., assignors to Standard Oil Company, Chicago, Ill.**

**Filed May 21, 1973, Ser. No. 362,464**
**Int. Cl.² C07C *51/33, 63/16***
**U.S. Cl. 260—524 R** **6 Claims**

1. A method of oxidizing di- or trimethylbenzenes with molecular oxygen to benzene di- or tricarboxylic acid under liquid phase conditions at temperatures in the range of 130° to 275°C. which comprises conducting said oxidation in the presence of the catalyst system consisting essentially of a source of bromine with manganese or cobalt and manganese and zirconium as the sole non-polyvalent metal wherein said catalyst system contains for each gram mole of such methylbenzene from 2 to 5 milligram atoms of the transition metal, manganese or total of cobalt and manganese and from 2 to 10 milligram atoms of bromine and based on each milligram atom of such transition metal from 0.1 to 3.0 milligram atom of zirconium.

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**3,920,736**

## METHOD FOR THE PREPARATION OF $\alpha,\beta$-UNSATURATED CARBOXYLIC ACIDS

**Wolfgang Gaenzler, Darmstadt-Eberstadt; Klaus Kabs, Auf der Letteilung, and Guenter Schroeder, Ober-Ramstadt, all of Germany, assignors to Rohm GmbH, Darmstadt, Germany**

**Filed Sept. 24, 1973, Ser. No. 399,705**
**Claims priority, application Germany, Sept. 27, 1972, 2247312**
**Int. Cl.² C07C *51/14***
**U.S. Cl. 260—533 A** **6 Claims**

1. In the method for preparing $\alpha,\beta$-unsaturated carboxylic acids by the oxidative carbonylation of ethylene or propylene with carbon monoxide and oxygen in a substantially non-aqueous reaction medium in the presence of a catalytic amount of a catalyst soluble in said non-aqueous medium, the improvement wherein said catalyst consists essentially of a compound of a metal of the fourth to seventh sub-groups of the Periodic System having an atomic weight between 47 and 185, and a compound of copper, zinc, cerium, tin, iron, cobalt, or nickel, said catalyst further essentially containing a halide, either of a said catalytic metal, of a non-catalytic metal, or of a mixture of a said catalytic metal and a non-catalytic metal.

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**3,920,737**

## RECOVERY OF FREE METHIONINE

**Toshiji Horisawa; Takeshi Kojima, and Ryoichi Itoh, all of Kobe, Japan, assignors to Kanegafuchi Kagaku Kogyo Kabushiki Kaisha, Osaka, Japan**

**Filed Oct. 25, 1973, Ser. No. 409,749**
**Int. Cl.² C07C *99/12***
**U.S. Cl. 260—534 S** **10 Claims**

1. In a process for recovering free methionine from an alkali metal salt thereof comprising repeatedly neutralizing an aqueous solution of said alkali metal salt of methionine with a mineral acid to precipitate free methionine, separating the resulting crystals of free methionine from the mother liquor, concentrating said mother liquor, adding said mineral acid to the resultant concentrate to precipitate an alkali metal salt of said mineral acid, separating the resulting two-phase mixture to remove the alkali metal salt of said mineral acid and recycling the liquid phase as a neutralizing agent to the neutralization step of the subsequent cycle of the process, the improvement which comprises:

acidifying said mother liquor prior to the concentration step with approximately a stoichiometric amount of said mineral acid to convert free methionine present in the mother liquor to its acid-addition salt with said mineral acid.

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**3,920,738**

## PREPARATION OF METHANE SULFONYL FLUORIDE

**Leroy Martin, Riverview, Mich., assignor to Pennwalt Corporation, Philadelphia, Pa.**

**Filed Mar. 20, 1974, Ser. No. 452,884**
**Int. Cl.² C07C *143/70***
**U.S. Cl. 260—543 F** **6 Claims**

1. The process for preparing and recovering methane sulfonyl fluoride comprising the following steps:

a. Mixing substantially equimolar amounts of methane sulfonyl chloride and potassium fluoride, said potassium fluoride being dissolved in about 12 to 24 moles of water per mole of potassium fluoride, while maintaining the reaction mixture in the liquid state at a temperature not exceeding about 50°C. until the methane sulfonyl chloride has reacted, and

b. Separating from the reaction mixture an oil layer (O-1) containing most of the methane sulfonyl fluoride from a water layer (W-1) containing by-product potassium chloride and a minor amount of methane sulfonyl fluoride, and

c. Subjecting oil layer (O-1) to distillation to produce an initial distillate which upon condensing separates into a water layer (W-2) containing a minor amount of dissolved methane sulfonyl fluoride and an oil layer (O-2) consisting of methane sulfonyl fluoride, withdrawing the condensed water layer (W-2) from the said distillation and, thereafter recycling it to dissolve potassium fluoride in Step A of the process, while returning the condensed oil layer (O-2) containing methane sulfonyl fluoride as reflux to the said distillation Step C until no more water appears in the distillate and thereafter withdrawing a distillate at an overhead temperature of 125°C. of pure methane sulfonyl fluoride, and

d. Subjecting water layer (W-1) obtained in Step A to distillation to produce an initial distillate which upon condensing separates into a water layer (W-3) containing dissolved methane sulfonyl fluoride and an oil layer (O-3) consisting of methane sulfonyl fluoride and a minor amount of water, withdrawing the said condensed oil layer (O-3) of methane sulfonyl fluoride and water and recycling it to oil layer (O-1) to be distilled in Step C, while returning said water layer W-3) as reflux to distillation Step D until no more methane sulfonyl fluoride appears in the distillate, and thereafter discontinuing distillation Step D, and discarding the aqueous still bottoms containing dissolved potassium chloride.

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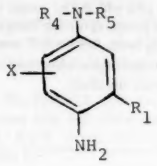
**3,920,739**

## PROCESS FOR THE PRODUCTION OF AROMATIC DIAMINES

**Hideaki Suda, Takaishi; Tatsuo Kanda; Hiroshige Tomita, both of Toyonaka; Hirotoshi Nakanishi, Minoo; Hiromu Hida, Minoo, and Tatsumi Nuno, Minoo, all of Japan, assignors to Sumitomo Chemical Company, Limited, Osaka, Japan**

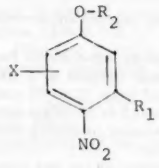
**Filed July 11, 1973, Ser. No. 378,059**
**Claims priority, application Japan, Feb. 13, 1973, 48-18191**
**Int. Cl.² C07C *143/74***
**U.S. Cl. 260—556 A** **20 Claims**

1. A process for the preparation of a diamino compound of the formula (I),



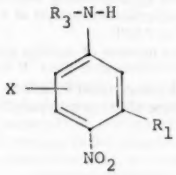
(I)

wherein $R_1$ is hydrogen, or a straight or branched $C_1$–$C_6$ alkyl, $R_4$ and $R_5$ are each $C_1$–$C_6$ alkyl unsubstituted or substituted by hydroxy, $C_1$–$C_3$ alkoxy, or a sulfonylamide of the formula, $-NHSO_2-R_{10}$ in which $R_{10}$ is $C_1$–$C_3$ alkyl, and X is hydrogen, chlorine, a bromine, $C_1$–$C_6$ alkyl or $C_1$–$C_3$ alkoxy, which comprises reacting a nitroether compound of the formula (IV),



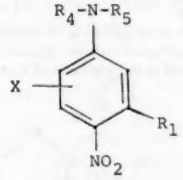
(IV)

wherein $R_1$ and X are as defined above, and $R_2$ is $C_1$–$C_6$ alkyl or benzyl, with ammonia or an aliphatic primary amine of the formula, $R_6-NH_2$ in which $R_6$ is $C_1$–$C_6$ alkyl unsubstituted or substituted by hydroxy, $C_1$–$C_3$ alkoxy or the sulfonylamide group defined above, to prepare a nitro compound of the formula (III),



(III)

wherein $R_1$ and X are as defined above, and $R_3$ is hydrogen, $C_1$–$C_6$ alkyl unsubstituted or substituted by hydroxyl, $C_1$–$C_3$ alkoxy or the sulfonylamide group defined above, and successively reacting the nitro compound (III) with an alkylating agent selected from the group consisting of $C_1$–$C_6$ alkyleneoxides and compounds of the formula, $R_5-Y$ in which $R_5$ is the same as defined above, and Y is hydroxyl, esters thereof, or a halogen atom, to prepare a nitroamine compound of the formula (II),



(II)

wherein $R_1$, $R_4$, $R_5$ and X are as defined above, and reducing the nitroamine compound (II) with a reducing agent to produce the objective compound (I).

**3,920,740**

## METHOD OF PRODUCING ACRYLAMIDE WITH A RANEY COPPER CATALYST

**Jerry J. Svarz, La Grange; Louis A. Goretta, Naperville, both of Ill., and Virgil L. Seale, Houston, Tex., assignors to Nalco Chemical Company, Chicago, Ill.**

**Continuation-in-part of Ser. No. 408,238, Oct. 19, 1973, abandoned, which is a continuation-in-part of Ser. No. 280,686, Aug. 14, 1972, abandoned. This application Apr. 5, 1974, Ser. No. 458,435**

**Int. Cl.[2] C07C** *103/12*

**U.S. Cl. 260—561 N** **23 Claims**

1. In an improved process for catalytically hydrolyzing acrylonitrile to acrylamide by contacting acrylonitrile in the presence of water with a Randy copper catalyst, the improvement which comprises

A. contacting an aqueous medium containing dissolved therein alkali metal hydroxide to a preselected, fixed group of copper aluminum alloy particles, alkali metal hydroxide being added incrementally to said medium during said contacting over said time interval,

a. said aqueous medium containing from about 0.5 to 40 weight percent dissolved alkali,

b. said group having average particle diameters in the range from about 0.002 to 0.5 inch,

c. said copper/aluminum alloy having initially a copper to aluminum weight ratio of from about 30:70 to 70:30,

d. said contacting being accomplished over a total time interval of from about 2 to 30 hours,

e. the addition rate of alkali metal hydroxide solution being so added to said medium during said contacting being from about 0.01 to 7 moles alkali metal hydroxide per mole of aluminum initially in said alloy particles per hour,

f. the total quantity of alkali metal hydroxide so added being in the range of from about 0.5 to 20 moles of alkali metal hydroxide per mole of aluminum initially present in said alloy,

g. the resulting aqueous medium produced during said contacting being maintained at a temperature in the range from about 32° to 180°F.,

B. washing the so-treated group of product particles to separate therefrom remaining unreacted alkali metal until the resulting wash water has a pH of less than about 8, and

C. contacting the so-washed group of particles with an aqueous substantially liquid phase composition comprising from about 10 to 75 weight percent acrylonitrile with the remainder to 100 weight percent thereof being water maintained at a temperature of from about 150° to 300°F.

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**3,920,741**

## N-ETHYL-N-(2-BUTENE-4-CHLORO)-AMINO-BENZENES AND PROCESSES FOR PRODUCING SAME

**Giuseppe Ribaldone, Gallarate, and Giampiero Borsotti, Novara, both of Italy, assignors to Montecatini Edison S.p.A., Milan, Italy**

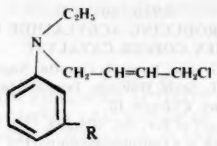
**Filed Nov. 3, 1972, Ser. No. 303,541**

**Claims priority, application Italy, Nov. 8, 1971, 30812/71**

**Int. Cl.[2] C07C** *87/60, 121/70*

**U.S. Cl. 260—577** **6 Claims**

1. A process for preparing a compound of the formula:



(II)

wherein R is hydrogen or methyl, said process comprising reacting an amino compound selected from the group consisting of N-ethyl-aniline and N-ethyl-m-toluidine with trans-1,4-dichloro-2-butene, the molar ratio of the trans-1,4-dichloro-2-butene to said amino compound being at least 5 to 1, at a temperature of about 20°C to 120°C at atmospheric pressure, in the presence of a neutralizing agent to form a reaction mass, subjecting the reaction mass to a first extraction with 0.5 N HCl to remove the unreacted amino compound and the di-substitution product formed in the reaction, thereafter subjecting the reaction mass to a second extraction with 2 N HCl to obtain an extract containing a chloro-amine selected from the group consisting of N-ethyl-N-(2-butene-4-chloro)-aniline and N-ethyl-N-(2-butene-4-chloro)-m-toluidine, neutralizing said extract and isolating said chloro-amine from the neutralized extract.

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**3,920,742**

**N-SEC-ALKYL-2,6-DINITRO-3,4-XYLIDINE HERBICIDES**

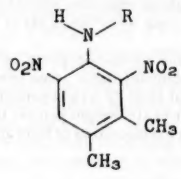
**Albert William Lutz, Montgomery Township, Somerset County, and Robert Eugene Diehl, Trenton, both of N.J., assignors to American Cyanamid Company, Stanford, Conn.**

**Continuation-in-part of Ser. No. 262,807, June 14, 1972, abandoned, which is a continuation-in-part of Ser. No. 174,938, Aug. 25, 1971, abandoned. This application Jan. 12, 1973, Ser. No. 323,000**

**Int. Cl.² C07C** *87/62, 93/14*

**U.S. Cl. 260—577** **5 Claims**

1. A compound having the structure:



wherein R is 1-ethylbutyl, 1-ethylpropyl, 1-methylpropyl and 1-methylbutyl.

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**3,920,743**

**PROCESS OF PREPARING AROMATIC AMINES**

**Konrad Baessler, Frankfurt am Main, and Kurt Mayer, Burgkirchen, Alz, both of Germany, assignors to Hoechst Aktiengellschaft, Frankfurt am Main, Germany**

**Continuation of Ser. No. 366,528, June 4, 1973, abandoned, which is a division of Ser. No. 117,078, Feb. 19, 1971, Pat. No. 3,761,425. This application Oct. 17, 1974, Ser. No. 515,486**

**Int. Cl.² C07C** *85/11*

**U.S. Cl. 260—580** **1 Claim**

1. In a process for the hydrogenation of halonitro-aromates selected from the group consisting of chloro-nitrobenzene, dichloro-nitrobenzene and chloro nitro methylbenzene, the improvement consisting essentially of hydrogenating said compounds in the presence of a sulfided platinum on carbon catalyst obtained by suspending a particulate platinum on carbon catalyst having an effective surface of at least 800 $m^2/g$ in an aqueous medium of a pH in the range of 0 to 5, saturating with hydrogen at a pressure in the range of normal pressure to 1 atmg. treating with 0.3 to 0.7 mol of a sulfidizing agent per each mol of hydrogen absorbed and isolating the catalyst from the aqueous medium.

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**3,920,744**

**PRODUCTION OF AMINES FROM SULFUR BEARING PARAFFINS**

**Robert M. Suggitt, Wappingers Falls, and Walter C. Gates, Jr., Newburgh, both of N.Y., assignors to Texaco Inc., New York, N.Y.**

**Filed Dec. 26, 1973, Ser. No. 428,507**

**Int. Cl.² C07C** *87/04, 87/14, 87/127*

**U.S. Cl. 260—583 M** **14 Claims**

1. A process for producing primary amines from paraffins which comprises:

a. nitrating a paraffin charge substantially free of sulfur compounds, wherein said paraffin is a straight chain aliphatic hydrocarbon of from 12 to 30 carbon atoms, and converting from about 5 to 50 weight percent of said paraffin to produce a mixture containing paraffin, nitroparaffin and by-products;

b. hydrogenating said mixture of (a) and converting said nitroparaffin to primary amine;

c. recovering said primary amine formed in (b) from a mixture of paraffin and byproducts;

d. introducing an impure paraffin feedstock containing from 20 parts and up to 2000 parts per million of sulfur as sulfur compounds, wherein said paraffin comprises straight chain aliphatic hydrocarbons of from 12 to 30 carbon atoms, and hydrogenating said feedstock in the presence of a hydrogenation catalyst at a temperature of from about 500° to 780°F.;

e. hydrogenating said mixture of paraffin and byproducts of (c); and

f. introducing said hydrogenated feedstock of (d) and said hyrogenated mixture of (e) as said paraffin charge to (a).

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**3,920,745**

**PROCESS FOR THE CATALYTIC HYDROGENATION OF UNSATURATED COMPOUNDS AND CATALYST EMPLOYABLE IN SUCH A PROCESS**

**Carlo Floriani, Pisa, and Giuseppe Fachinetti, Fauglia, both of Italy, assignors to Snamprogetti S.p.A., San Donato Milanese, Italy**

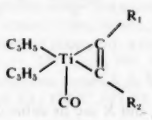
**Filed Oct. 16, 1974, Ser. No. 515,227**

**Claims priority, application Italy, Oct. 16, 1973, 30154/73**

**Int. Cl.² C07C** *9/00, 5/02*

**U.S. Cl. 260—683.9** **3 Claims**

1. Process for the hydrogenation of ethylenically or acetylenically unsaturated hydrocarbons characterized in that the reaction is carried out in the presence of a catalyst, having the formula



in which $R_1$ and $R_2$ are hydrogen, alkyl, aryl or cycloalkyl radicals having up to 10 carbon atoms.

3,920,746

## PREPARATION OF TERTIARY-BUTYL ARYL ETHERS

Willy Leimgruber, Montclair, and Ernest Mohacsi, Nutley, both of N.J., assignors to Hoffmann-La Roche Inc., Nutley, N.J.

Division of Ser. No. 208,952, Dec. 16, 1971, abandoned. This application Jan. 16, 1974, Ser. No. 433,643

Int. Cl.[2] C07C 91/02, 93/02, 93/10, 95/02

U.S. Cl. 260—584 C 3 Claims

1. A process for the preparation of substantially pure N,N-dimethylformamide di-t-butyl acetal, which comprises the acid-catalyzed trans-acetalization of N,N-dimethylformamide dimethyl acetal with tertiary butanol, wherein said acid is a sterically, highly hindered phenol, and the simultaneous removal of the formed methanol, whereby substantially pure N,N-dimethylformamide di-t-butyl acetal is obtained.

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3,920,747

## HYDROAZULENONES

Peter Naegeli, Wettingen, Switzerland, assignor to Givaudan Corporation, Clifton, N.J.

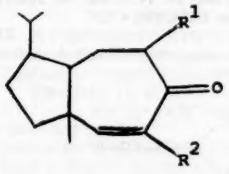
Filed Nov. 7, 1973, Ser. No. 413,469

Claims priority, application Switzerland, Nov. 15, 1972, 16607/72

Int. Cl.[2] C07C 49/46, 45/00

U.S. Cl. 260—586 C 4 Claims

1. Hydroazulenones of the general formula



(I)

wherein $R^1$ and $R^2$ each independently represent a hydrogen atom or a lower alkyl group.

4. A process which comprises reacting 3-isopropyl-1-methyl-2-(3-oxo-4-pentenyl) -1- cyclopentene dissolved in a benzeneethyl ether mixture in the presence of tin tetrachloride, at a temperature from about 0°C. to ambient room temperature, to form 1-isopropyl-3a-methyl-1,2,3,3a,6,7,8,8a-octahydroazulen-6-one.

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3,920,748

## STEROID TOTAL SYNTHESIS AND INTERMEDIATES

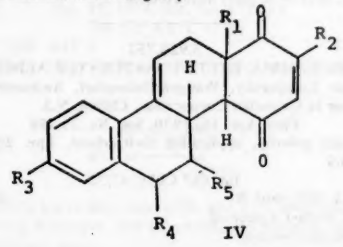
Zdenek Valenta, Fredericton, Canada, assignor to Hoffman-La Roche Inc., Nutley, N.J.

Continuation-in-part of Ser. No. 261,853, June 12, 1972, Pat. No. 3,876,705. This application Aug. 23, 1973, Ser. No. 390,827

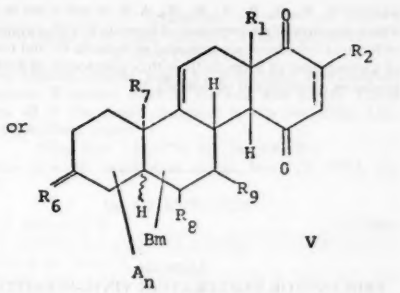
Int. Cl.[2] C07C 45/00

U.S. Cl. 260—586 E 7 Claims

1. A process for the preparation of a compound of the formula selected from the group



IV

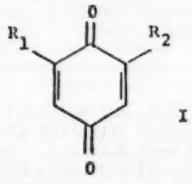


or

V

wherein $R_1$ and $R_2$ both independently are $C_1$–$C_4$ lower alkyl; $R_3$ is hydrogen, $C_1$–$C_7$lower alkoxy, $C_7$–$C_{12}$ aryl lower alkoxy or conventional $C_1$–$C_{12}$ acyloxy wherein the acyl moiety is derived from an unsubstituted or substituted alkanoic or benzoic acid wherein the substituents are selected from the group consisting of lower alkyl, nitro and halo; $R_4$, $R_5$, , $R_8$ and $R_9$ are independently selected from the group consisting of hydrogen or $C_1$–$C_7$ lower alkyl; $R_6$ is oxo, $C_1$–$C_3$ lower alkylenedioxy, $C_6$–$C_{12}$ arylenedioxy, H,H or H,$R_{10}$, where $R_{10}$ is $C_1$–$C_7$ lower alkoxy, $C_7$–$C_{12}$ aryl lower alkoxy or conventional $C_1$–$C_{12}$ acyloxy wherein the acyl moiety is derived from and unsubstituted or substituted alkanoic or benzoic acid wherein the substituents are selected from the group consisting of lower alkyl, nitro and halo; $R_7$ is $C_1$–$C_4$ lower alkyl or $C_2$–$C_4$ lower alkylene, A is an additional carbon-carbon bond between positions 4 and 5; B is an additional carbon-carbon bond between positions 5 and 6; *m* and *n* are 0 or 1 with the proviso that if either is 1 then the other is 0

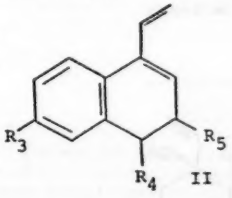
which process comprises reacting in the presence of a Lewis acid a compound of the formula



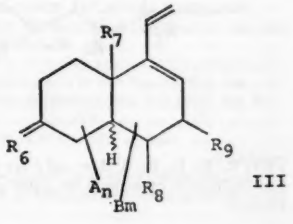
I

wherein $R_1$ and $R_2$ are as above

with a compound of the formula selected from the group



II



or

III

wherein $R_3$, $R_4$, $R_5$, $R_6$, $R_7$, $R_8$, $R_9$, A, B, *m* and *n* are as above where reaction of a compound of formula II with a compound of formula I produces a compound of formula IV and reaction of a compound of formula III with a compound of formula I produces a compound of formula V.

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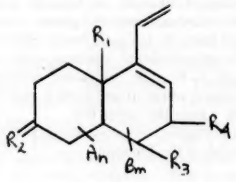
**3,920,749**

## PROCESS FOR DEHYDRATING VINYL-SUBSTITUTED TERTIARY ALCOHOLS

**Noal Cohen, Montclair, N.J., assignor to Hoffmann-La Roche Inc., Nutley, N.J.**

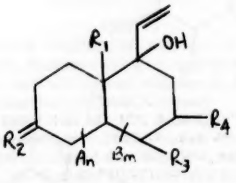
**Filed Aug. 17, 1973, Ser. No. 389,310**
**Int. Cl.[2] C07C** *1/24, 45/00*
**U.S. Cl. 260—586 R** **4 Claims**

**1.** A process for the production of a compound of the formula



II

wherein $R_1$ is $C_{1-4}$ lower alkyl; $R_2$ is oxo, $C_{1-5}$ lower alkylenedioxy, $C_{6-12}$ arylenedioxy, H,H or H,$R_5$ where $R_5$ is $C_{1-7}$ lower alkoxy, $C_{7-12}$ aryl lower alkoxy or $C_{1-12}$ acyl; $R_3$ and $R_4$ are independently selected from the group consisting of hydrogen or $C_{1-7}$ lower alkyl; A is an additional carbon-carbon bond between positions 4 and 5; B is an additional carbon-carbon bond between positions 5 and 6; *m* and *n* are 0 or 1 with the proviso that if either is 1 then the other is 0, which comprises dehydrating a compound of the formula



I

where $R_1$, $R_2$, $R_3$, $R_4$, A, B, *m* and *n* are as defined above, with borontrifluoride etherate in the liquid phase at elevated temperature.

**3,920,750**

## PROCESS FOR PRODUCING VANILLIN

**Raphael Katzen; Vincent B. Diebold, and Jerald L. Mestemaker, all of Cincinnati, Ohio, assignors to Canadian International Paper Company, Montreal, Canada**

**Filed Mar. 21, 1974, Ser. No. 453,516**
**Int. Cl.[2] C07C** *45/00*
**U.S. Cl. 260—600 A** **7 Claims**

**1.** A process for producing vanillin by oxidizing lignin-containing, alkaline, kraft black liquor with an oxygen containing gas, which comprises passing both a solution of said lignin-containing, alkaline, kraft black liquor and said oxygen containing gas cocurrently upwardly through an oxidation apparatus comprising a vertically oriented column, said column having a top and a bottom and a plurality of spaced horizontal gas diffusing plates disposed within said column and spaced between the top and the bottom and each providing a plurality of spaced perforations, with each horizontal perforated plate extending over most, but not all, of the horizontal cross section of said column, each of said horizontal perforated plates having a vertically downwardly extending solid baffle plate.

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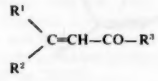
**3,920,751**

## PROCESS FOR THE PREPARATION OF ETHYLENIC CARBONYL COMPOUNDS

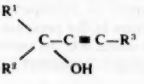
**Pierre Chabardes, and Yvon Querou, both of Lyon, France, assignors to Rhone-Poulenc, Paris, France**

**Continuation of Ser. No. 779,633, Nov. 27, 1968, abandoned. This application Dec. 16, 1971, Ser. No. 208,917**
**Int. Cl.[2] C07C** *47/20*
**U.S. Cl. 260—601 R** **22 Claims**

**1.** A process for the preparation of ethylenic carbonyl compounds of the formulae:



and the tautomers thereof, comprising heating in the liquid phase an acetylenic alcohol of the formulae:



in the presence of a catalyst of a compound of a transition metal selected from the group consisting of vanadium, niobium, molybdenum, tungsten and rhenium, and wherein $R^1$, $R^2$ and $R^3$ are inert under the conditions of the process and are selected from the group consisting of hydrogen, aliphatic, cycloaliphatic, arylaliphatic and aromatic radicals, and wherein $R^1$ and $R^2$ together may represent a divalent aliphatic radical of 3 to 12 carbon atoms and make with the carbon atom to which they are attached a carbocyclic ring, the divalent radicals being either saturated or containing double bonds, and wherein the aliphatic, cycloaliphatic, arylaliphatic or aromatic radicals may be substituted by halogen, hydroxy, alkoxy, acyl or acyloxy substituents.

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**3,920,752**

## NOVEL GAMMA, DELTA UNSATURATED ALDEHYDES

**Dietmar Lamparsky, Wangen-Dubendorf, Switzerland, assignor to Givaudan Corporation, Clifton, N.J.**

**Filed Apr. 16, 1970, Ser. No. 29,258**
**Claims priority, application Switzerland, Apr. 26, 1969, 6405/69**
**Int. Cl.[2] C07C** *47/20*
**U.S. Cl. 260—601 R** **2 Claims**

**1.** 2-Methyl-4-decenal.
**2.** 4trans-Decenal.

3,920,753

## METHOD OF PRODUCING GLYCOLALDEHYDE

Toshihide Yukawa, Kawasaki, and Hachiro Wakamatsu, Musashino, both of Japan, assignors to Ajinomoto Co., Inc., Tokyo, Japan

Filed May 30, 1974, Ser. No. 474,616
Claims priority, application Japan, June 12, 1973, 48-66020
Int. Cl.² C07C 47/19
U.S. Cl. 260—602 4 Claims

1. A method of producing glycolaldehyde which comprises the steps of holding formaldehyde in a reaction zone in contact with carbon monoxide and hydrogen in an inert liquid solvent in the presence of an effective amount of cobalt carbonyl until said glycolaldehyde is formed, the mole ratio of said carbon monoxide to said hydrogen in said reaction zone being between 1:19 and 19:1, the combined pressure of said carbon monoxide and of said hydrogen in said reaction zone being between 10 and 500 kg/cm², the temperature of said reaction zone being between 15° and 250°C, and removing the formed glycolaldehyde from said reaction zone.

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3,920,754

## HYDROFORMYLATION PROCESS

Anthony Wu, and Hubert H. Thigpen, both of Corpus Christi, Tex., assignors to Celanese Corporation, New York, N.Y.

Filed Sept. 11, 1970, Ser. No. 71,414
Int. Cl.² C07C 45/08
U.S. Cl. 260—604 HF 7 Claims

1. A process for hydroformylating an alpha-alkene at the double bond to form a product which is a member of the group consisting of formyl-substituted and hydroxymethyl-substituted derivatives of said alkene, which process comprises:

reacting said alkene with hydrogen and carbon monoxide at superatmospheric pressure and at a temperature of at least about 150°C in the presence of molecular oxygen.

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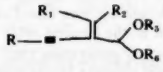
3,920,755

## PROCESS FOR PRODUCING ALKENALS AND INTERMEDIATES THEREFOR

William L. Schreiber, Ocean, and Alan O. Pittet, Atlantic Highlands, both of N.J., assignors to International Flavors & Fragrances Inc., New York, N.Y.

Division of Ser. No. 383,579, July 30, 1973. This application Oct. 17, 1974, Ser. No. 515,569
Int. Cl.² C07C 43/30
U.S. Cl. 260—615 A 1 Claim

1. A 2-alkylidene-3-alkynal dilower alkyl acetal having the formula:



wherein R is lower alkyl; one of $R_1$ and $R_2$ is lower alkyl and the other is hydrogen, and $R_3$ and $R_4$ are each the same or different lower alkyl.

3,920,756

## METHOD FOR PREPARING CATECHOL AND HYDROQUINONE

Susumu Tahara; Shigeki Nagai; Yurio Hayashi; Kou Hoshide; Shigenori Kawazoe; Katsuzo Harada, and Koichi Yamamoto, all of Ube, Japan, assignors to Ube Industries, Ltd., Yamaguchiken, Japan

Filed Mar. 13, 1974, Ser. No. 450,751
Claims priority, application Japan, Mar. 23, 1973, 48-32601
Int. Cl.² C07C 37/00
U.S. Cl. 260—621 G 13 Claims

1. A method for preparing catechol and hydroquinone, comprising the steps of:

oxidizing phenol with 10 to 100 percent by mole based on the amount by mole of said phenol, of hydrogen peroxide in an aqueous medium at a temperature of 10° – 80°C. at a pH not higher than 6.0 in the presence of a catalyst consisting of at least one organic metal coordinate compound which consists of at least one organic ligand component coordinate-bonded with at least one metal atom component selected from the group consisting of iron, copper, chromium, and cobalt and selected from the group consisting of (a) any aromatic chelating compound selected from the group consisting of catechol, salicylic aldehyde, salicylic acid, thiosalicylic acid, o-aminophenol, salicylic amide, o-nitrophenol, anthranilic acid, orthanilic acid, o-phenol sulfonic acid, and α-nitroso-β-naphthol, (b) a heterocyclic monodentate coordinating compound selected from the group consisting of pyridine, picolines, lutidines and quinoline, (c) a heterocyclic polydentate coordinate compounds selected from the group consisting of nicotinic acid, nicotinic amide, isocinchomeronic acid, α-thiophenic acid, o-phenanthroline, 2-mercaptopyridine, 2-aminothiazole, 8-hydroxyquinoline, mercaptobenzothiazole and ε-caprolactam, and (d)aliphatic chelating compounds selected from the group consisting of ethylene diamine, D,L-α-alanine, D,L-β-alanine, 2,2′,2″-trihydroxyethylamine, thioglycollic acid, thioacetamide, thiourea, 2,3-dimercapto-1-propanol, ethylenediaminetetraacetic acid, dimethylglyoxime, 2-hydroxyethylamine, ethylene cyanohydrin, oxamide, diethylene glycol, glutamic acid, lysine, methionine, glycine and arginine, said catalyst being in an amount of one-thirty to 100 percent by mole calculated in terms of said metal component contained therein, based on the amount by mole of said phenol, and isolating the resulting catechol and hydroquinone from said oxidation mixture.

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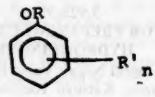
3,920,757

## CHLORINATION WITH SULFURYL CHLORIDE

William David Watson, Midland, Mich., assignor to The Dow Chemical Company, Midland, Mich.

Continuation of Ser. No. 174,914, Aug. 25, 1971, abandoned, which is a continuation-in-part of Ser. No. 13,751, Feb. 24, 1970, abandoned. This application Jan. 23, 1975, Ser. No. 543,389
Int. Cl.² C07C 39/28, 39/30
U.S. Cl. 260—623 H 12 Claims

1. In the process for mono- or di chlorinating an aromatic compound in the para or the para and ortho position of the formula



wherein R = H, phenyl, alkyl or carboxyalkyl, and
R′ = alkyl, phenyl, alkylphenyl, phenalkyl or halo in the ortho or meta position, and
n = 0–2
by contacting the aromatic compound with sulfuryl chloride in the liquid phase, the improvement comprising conducting the reaction in the presence of a metal salt-organic sulfur catalyst
the metal salt component of the catalyst is selected from the group consisting of the metal halides or metal phenoxides of antimony, aluminum, iron, tin, titanium, zinc or mixtures thereof, in an amount greater than about 0.1 percent by weight of the aromatic compound, and
the organic sulfur component of the catalyst is selected from the group consisting of thiophene, p-dithiane, diphenyl sulfide, thianthrene, dibenzyl sulfide, polyphenylene sulfide, diphenyl disulfide, thiophenol, dibenzothiophene, pentamethylene sulfide, carbon disulfide, or any of these sulfur compounds containing substituents selected from the group consisting of alkyl, alkoxy, halo, and mixtures thereof, said alkyl and alkoxy groups containing up to 10 carbon atoms, in an amount from about 0.02 to about 10 percent by weight of the aromatic compound.

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## 3,920,758
## PREPARATION OF PERFUMERY MATERIAL POSSESSING A SANDALWOOD-LIKE ODOR

**Alfred Stern, Englewood, and Morris Dunkel, Paramus, both of N.J., assignors to Universal Oil Products Company, Des Plaines, Ill.**

**Continuation of Ser. No. 770,056, Oct. 23, 1968, abandoned. This application Jan. 10, 1972, Ser. No. 216,786**
**Int. Cl.² C07C *35/21***
**U.S. Cl. 260—631 H** **2 Claims**

1. A process for preparing m-$C_{10}$-terpinylcyclohexanols possessing a sandalwood-like odor in which a mixture predominating in p-isobornylphenol is equilibrated in the presence of an aluminum chloride catalyst at a temperature of about 100° to about 150°C. and a time of from about 2 to about 24 hours to form the corresponding meta-isomer, thereafter hydrogenating the same with hydrogen in contact with a hydrogenation catalyst, and recovering the resultant corresponding $C_{10}$-terpinylcyclohexanols.

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## 3,920,759
## ETHYNYLATION CATALYST AND METHOD OF PRODUCING ALKYNOLS BY LOW PRESSURE REACTIONS

**Eugene V. Hort, Piscataway, N.J., assignor to GAF Corporation, New York, N.Y.**

**Filed Apr. 24, 1972, Ser. No. 246,607**
**Int. Cl.² C07C *29/09*, *33/04***
**U.S. Cl. 260—635 Y** **8 Claims**

1. A low pressure process for the preparation of butynediol, comprising reacting formaldehyde and acetylene, at a temperature of about 60° to about 120°C and at a pressure of less than about 2 atmospheres partial pressure of acetylene in an aqueous medium, under agitation, in the presence of an ethynylation catalyst consisting essentially of a water-insoluble cuprous acetylide powder containing about 5 to about 20%, by weight, of copper, 0 to about 3%, by weight, of bismuth, and a magnesium silicate carrier therefor.

## 3,920,760
## PROCESS FOR THE PRODUCTION OF NEOPENTYL GLYCOL

**James B. Heinz, Longview, Tex., assignor to Eastman Kodak Company, Rochester, N.Y.**

**Filed Sept. 3, 1974, Ser. No. 502,332**
**Int. Cl.² C07C *29/14***
**U.S. Cl. 260—635 A** **7 Claims**

1. In a process for the production of neopentyl glycol which consists of:
A. the aldol condensation of isobutyraldehyde with formaldehyde in the presence of a basic aldol catalyst to produce hydroxypivaldehyde;
B. separation of the hydroxypivaldehyde containing stream from the effluent of the aldol reactor by decantation; and
C. the subsequent hydrogenation of the hydroxypivaldehyde in the presence of a Raney nickel catalyst slurry,
the improvement which comprises the following steps:
1. filtering solid particles from the effluent from the aldol reaction;
2. controlling the ratio of isobutyraldehyde to formaldehyde so as to maintain a thin nonviscous interface layer in the decanter by maintaining the isobutyraldehyde and formaldehyde molar ratio in the effluent stream over about 2.2 to 1 and by not cooling the effluent stream below about 60°C prior to decantation;
3. mixing the organic stream from the decanter with water in proportions of from about 1 part water to about 15 to 20 parts of organic material;
4. passing said water diluted organic stream through a coalescer so as to produce an organic phase and an aqueous phase;
5. removing the organic phase from the coalescer and passing said phase into an aldehyde stripper column;
6. removing a hydroxypivaldehyde containing stream from the bottom of the said aldehyde stripper column and introducing said hydroxypivaldehyde containing stream into the hydrogenation reactor; and
7. recovering from the hydrogenation reactor an effluent stream containing neopentyl glycol.

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## 3,920,761
## PRODUCTION OF VINYL CHLORIDE

**Gerd Krome, Ludwigshafen, Germany, assignor to BASF Aktiengesellschaft, Ludwigshafen (Rhine), Germany**

**Filed Feb. 1, 1974, Ser. No. 438,754**
**Claims priority, application Germany 2307376**
**Int. Cl.² C07C *21/06***
**U.S. Cl. 260—656 R** **6 Claims**

1. In a process for the production of vinyl chloride by the cleavage of dichloroethane to form a reaction mixture containing vinyl chloride, hydrogen chloride, unreacted dichloroethane and the impurities 1,3 butadiene and chloroprene, the improvement which comprises: adding from 0.01 to 1% of chlorine to said reaction mixture based on the weight of the dichloroethane used in the process after the cleavage of dichloroethane but before separating vinyl chloride from said mixture, whereby said chlorine reacts with said 1,3 butadiene and chloroprene, and thereafter separating said vinyl chloride from said unreacted dichloroethane, said vinyl chloride remaining substantially unreacted with said chlorine.

3,920,762

## NOVEL LARGE RING COMPOUNDS

Günther Wilke, and Paul Heimbach, both of Mulheim (Ruhr), Germany, assignors to Studiengesellschaft Kohle m.b.H., Mulheim (Ruhr), Germany

Division of Ser. No. 109,949, Jan. 26, 1971, Pat. No. 3,849,506, which is a continuation of Ser. No. 843,220, July 18, 1969, Pat. No. 3,586,727, Ser. No. 845,901, July 29, 1969, Pat. No. 3,629,347, and Ser. No. 845,904, July 29, 1969, Pat. No. 3,606,313, each is a continuation-in-part of Ser. No. 582,775, Sept. 27, 1966, abandoned. This application Apr. 22, 1974, Ser. No. 463,089

Claims priority, application Germany, Sept. 29, 1965, 24439

Int. Cl.[2] C07C *13/00*

U.S. Cl. 260—666 PY 2 Claims

1. Bicyclo (10, 8, 0) Eicosadiene cis 1 cis trans [1, 10, 3, 7.

3,920,763

## PALLADIUM CATALYZED CODIMERIZATION PROCESS

Jin Sun Yoo, South Holland, Ill., and Ronald L. Milam, Media, Pa., assignors to Atlantic Richfield Company, Philadelphia, Pa.

Continuation of Ser. No. 53,654, July 9, 1970, abandoned. This application Jan. 2, 1973, Ser. No. 320,164

Int. Cl.[2] C07C *3/21*

U.S. Cl. 260—680 B 9 Claims

1. In a process for the codimerization of a conjugated diene with an alkene to a trans-1,4-diene in the presence of a catalyst, the improvement comprising using as a catalyst a minor amount of $\pi$-allyl complex of:

A. palladium,

B. monotertiary phosphine electron donor ligand, and

C. combination of reducing agent capable of reducing the palladium to an oxidation state of less than 2 and Lewis acid capable of forming a coordination bond with palladium, supported on

D. acidic, solid, silica-based material; wherein the molar ratio of (B) to (A) is from about 0.5 to 15:1, the molar ratio of (C) to (A) is from about 2 to 40:1 and the $\pi$-allyl complex is formed from a conjugated diene.

3,920,764

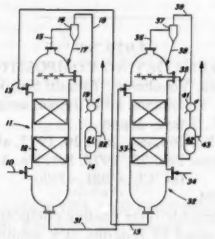
## DEHYDROGENATION PROCESS

Herbert Riegel, Palisades Park, N.J.; Harvey D. Schindler, New York, N.Y.; Morgan C. Sze, Upper Montclair, N.J., and Maurice E. Brooks, Great Neck, N.Y., assignors to The Lummus Company, Bloomfield, N.J.

Division of Ser. No. 769,811, Oct. 23, 1968, Pat. No. 3,637,895. This application Oct. 14, 1971, Ser. No. 189,391

Int. Cl.[2] C07C *3/00*

U.S. Cl. 260—683 R 7 Claims



1. A process for producing an alkenyl substituted aromatic hydrocarbon from the corresponding alkyl substituted aromatic hydrocarbon, comprising:

a. contacting in a first reaction zone an unsupported molten mixture of the higher and lower valent forms of a multivalent metal chloride selected from the group consisting of the chlorides of copper, manganese, cobalt, iron and chromium with an oxygen containing gas to produce the corresponding oxychloride, said contacting being effected in the absence of added chlorine and hydrogen chloride;

b. contacting in a second reaction zone the alkyl substituted aromatic hydrocarbon with a dehydrogenation reaction promoter consisting essentially of the molten mixture from step (a) to effect dehydrogenation thereof to the corresponding alkenyl substituted aromatic hydrocarbon, said contacting being effected in the absence of added chlorine and hydrogen chloride;

c. recovering from step (b) an effluent containing said alkenyl substituted aromatic hydrocarbon; and

d. passing melt from step (b) to step (a).

3,920,765

## INHIBITION OF POLYMERIZATION DURING THE ISOMERIZATION OF OLEFINS

Kenneth J. Frech, and Roger W. Spoerke, both Akron, Ohio, assignors to The Goodyear Tire & Rubber Company, Akron, Ohio

Filed Nov. 12, 1973, Ser. No. 415,258

Int. Cl.[2] C07C *5/30*

U.S. Cl. 260—683.2 7 Claims

1. In a process for isomerization which comprises subjecting olefins selected from the group consisting of 2,3-dimethyl-1-butene, 2-methyl-1-pentene, 2-ethyl-1-butene, and 2-methyl-1-butene to a catalyst consisting of macroreticular sulfonated, ion-exchange resins, said isomerization being conducted in the liquid phase at a temperature between 5°C and 80°C and at liquid hour space velocities between about 0.5 and about 40, the improvement comprising adding to said isomerization from about 0.5 to about 1 percent by weight of water based on said olefins.

3,920,766

## PRODUCTION OF ISOBUTANE FROM TERTIARY BUTYL ALCOHOL

John C. Jubin, Jr., Wallingford, and Henry R. Grane, Springfield, both of Pa., assignors to Atlantic Richfield Company, Los Angeles, Calif.

Filed Feb. 27, 1974, Ser. No. 443,643

Int. Cl.[2] C07C *9/00, 11/00*

U.S. Cl. 260—683.9 9 Claims

1. A method for preparing isobutane which comprises contacting tertiary butyl alcohol at a temperature in the range of from 450°F to 850°F. with hydrogen at a partial pressure of from 150 psi to 350 psi at the reactor outlet, in the presence of a supported nickel metal or supported sulfided nickel-molybdem catalyst.

3,920,767

## ISOPARAFFIN-OLEFIN ALKYLATION USING HF-ETHYL FLUORIDE CATALYSIS WITH RECOVERY OF ETHYL FLUORINE AND ALKYLATION OF SECONDARY AND TERTIARY ALKYL FLUORIDES

Cecil O. Carter, Bartlesville, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.

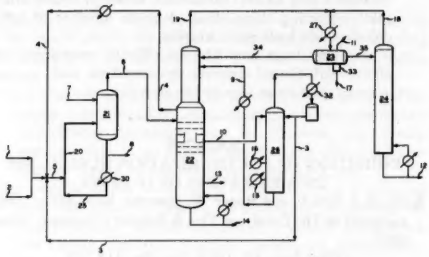
Filed May 29, 1974, Ser. No. 474,255

Int. Cl.[2] C07C *3/54*

U.S. Cl. 260—683.48 4 Claims

1. In the alkylation of an isoparaffin with an olefin which comprises reacting an isoparaffin with an olefin in the presence of an acid catalyst comprising HF to obtain a reaction effluent containing isoparaffin, normal paraffin, propane, ethyl fluoride and higher organic fluorides with settling of the acid phase and obtaining a hydrocarbon phase containing isoparaffin, normal paraffin, propane, ethyl fluoride and said higher fluorides with subsequent passage of said hydrocarbon phase to fractionation in a fractionation zone, the method of

recovering ethyl fluroide into HF and simultaneously alkylating higher organic fluorides comprising: (1) in said fractionation zone taking off overhead propane and lighter hydrocarbons, (2) separating isoparaffin as a side-draw stream from said fractionation zone and recycling said isoparaffin stream to the alkylation reaction zone, (3) separating said normal paraffin as a side-draw stream from the lower portion of said fractionation zone, (4) separating a bottoms alkylate product, (5) introducing into said fractionation zone below said over-



head and above said side-draw stream of isoparaffin of step 2 a liquid HF in an amount to absorb ethyl fluoride and to cause reaction in the presence of said isoparaffin of said higher fluorides, (6) passing said liquid HF in said fractionation zone downwardly to a liquid HF-collecting-and-removal zone, said zone being located below said side-draw of isoparaffin of step 2 so that ethyl fluoride is absorbed and said isoparaffin is alkylated with said higher fluorides, and (7) separating from said HF-collecting-and-removal zone a side-draw stream of enriched liquid HF containing ethyl fluoride.

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**3,920,768**

## ARYLIMIDE-EPOXY RESIN COMPOSITES

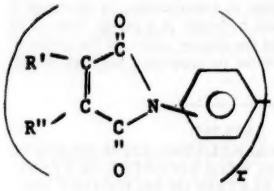
**George T. Kwiatkowski, Green Brook, N.J., assignor to Union Carbide Corporation, New York, N.Y.**

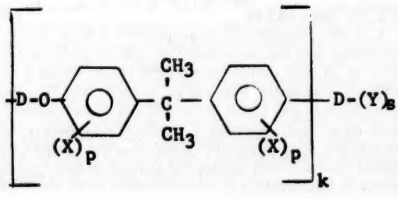
**Filed Jan. 14, 1974, Ser. No. 433,114**

**Int. Cl.[2] C08G** *45/12*

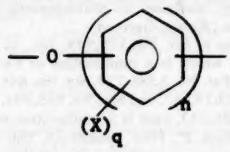
**U.S. Cl. 260—837 R** **10 Claims**

1. Thermosetting resin composition consisting essentially of A. About 5 to about 95% by weight of an arylimide having the formula:

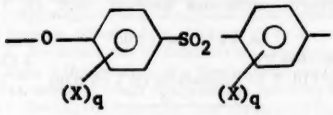




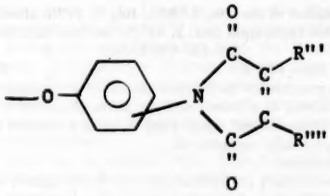
wherein D is at least one rdical selected from the group consisting of:



and



wherein Y is a radical having the formula:



wherein

each of r', R'', R''' and R'''' is a monovalent radical selected from the group consisting of H, lower alkyl having 1 to 8 carbon atoms or chlorine,

*r* is an integer having values of 1 to 3,

*s* is an integer having values of 0 to 3, with the proviso that when *s* is O, Y is H or X

*n* is an integer having values of 1 to 5,

*k* is an integer having values of 0 to 100,

X is a halogen selected from the group consisting of F, Cl, or Br and,

each of *q* and *p* are integers having values of 0 to 4, and

B. about 95 to about 5% by weight of an epoxy resin having an average of more than one epoxy group,

per molecule.

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**3,920,769**

## NOVEL COATING COMPOSITION

**Hiroshi Yaginuma, Yokohama; Takashi Suzuki, Yamato, and Atutane Kimi, Yokohama, all of Japan, assignors to Nippon Zeon Co., Ltd., Tokyo, Japan**

**Division of Ser. No. 264,466, June 20, 1972, abandoned. This application Feb. 25, 1974, Ser. No. 445,235**

**Int. Cl.[2] C08L** *47/00*

**U.S. Cl. 260—894** **6 Claims**

1. A water thinnable resin coating composition comprising the product obtained by reacting at a temperature of 50° – 300°C. for a period of 5 minutes to 10 hours, an unsaturated carboxylic acid or its anhydride selected from the group consisting of acrylic acid, methacrylic acid, crotonic acid, maleic acid, citraconic acid, fumaric acid, maleic anhydride and citraconic anhydride with a blend comprising 90 – 40% by weight of polybutadiene having at least 60% cis-configuration

and a number average molecular weight of 500 – 20000 and 10 – 60% by weight of polypentadiene prepared by polymerizing 1,3-pentadiene in a homogeneous system using a Friedel-Crafts catalyst having at least 70% transconfiguration and a number average molecular weight of 500 – 20000 by addition reaction, and neutralizing the reaction product.

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**3,920,770**

## RUBBER MODIFIED POLYPHENYLENE OXIDE COMPOSITION

**Seizo Nakashio, Nishinomiya; Isao Maruta, Takatsuki; Kazuo Hayatsu, Takatsuki, and Yoichi Kono, Takatsuki, all of Japan, assignors to Sumitomo Chemical Company, Ltd., Osaka, Japan**

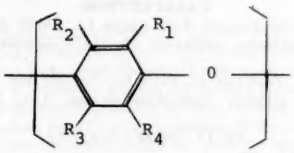
**Filed Dec. 10, 1969, Ser. No. 884,041**

**Claims priority, application Japan, Dec. 27, 1968, 44-543**

**Int. Cl.[2] C08L** *23/16*

**U.S. Cl. 260—897 R** **2 Claims**

1. A polyphenylene oxide composition comprising a mixture of polyphenylene oxide having a structural unit represented by the general formula



wherein $R_1$, $R_2$, $R_3$ and $R_4$ are hydrogen, halogen, hydrocarbon groups, substituted hydrocarbon groups, cyano groups, hydrocarbonoxy groups, substituted hydrocarbonoxy groups, amino or substituted amino groups or nitro groups, and 0.5 to 10% by weight of a rubbery ethylene-propylene-diene terpolymer based on the weight of the whole composition.

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**3,920,771**

## O-ETHYL-S-(N)-PROPYL-S-CARBAMOYLALKYL DITHIOPHOSPHATES

**Ernst Beriger, Allschwil, Switzerland, assignor to Ciba-Geigy Corporation, Ardsley, N.Y.**

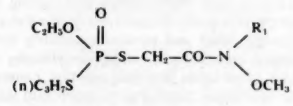
**Division of Ser. No. 315,973, Dec. 19, 1972, Pat. No. 3,845,171. This application Aug. 9, 1974, Ser. No. 495,933**

**Claims priority, application Switzerland, Dec. 24, 1971, 18909/71; Jan. 3, 1972, 16041/72**

**Int. Cl.[2] C07F** *9/165;* **A01N** *9/36*

**U.S. Cl. 260—943** **1 Claim**

1. A compound of the formula



wherein $R_1$ represents hydrogen or methyl.

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**3,920,772**

## PHOSPHORAMIDATES AND PHOSPHONAMIDATES

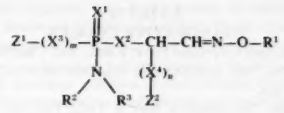
**Leonard J. Stach, Riverside, Ill., assignor to Velsicol Chemical Corporation, Chicago, Ill.**

**Filed Sept. 5, 1972, Ser. No. 286,488The portion of the term of this patent subsequent to Nov. 18, 1992, has been disclaimed.**

**Int. Cl.[2] C07F** *9/24;* **A01N** *9/36*

**U.S. Cl. 260—944** **5 Claims**

1. A compound of the formula



wherein $R^1$ is lower alkyl; $R^2$ and $R^3$ are each selected from the group consisting of hydrogen and lower alkyl; $X^1$, $X^2$, $X^3$ and $X^4$ are independently selected from the group consisting of oxygen and sulfur; $m$ is an integer from 0 to 1, $n$ is zero; $Z^1$ is selected from the group consisting of lower alkyl, phenyl, lower alkylphenyl, halophenyl and lower alkyl-halophenyl; and $Z^2$ is hydrogen.

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**3,920,773**

## MODIFICATION OF POLYMERS

**Gottfried Pampus, Leverkusen; Wolfgang Oberkirch, Cologne; Peter Günther, Opladen, and Nikolaus Schon, Leverkusen, all of Germany, assignors to Bayer Aktiengesellschaft, Germany**

**Continuation of Ser. No. 114,043, Feb. 9, 1971, abandoned. This application Dec. 15, 1972, Ser. No. 315,437**

**Claims priority, application Germany, Mar. 3, 1970, 2009740**

**Int. Cl. C08d** *5/02;* **C08f** *5/00*

**U.S. Cl. 260—94.7 HA** **4 Claims**

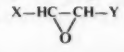
1. A process for treating a polymer containing —CH=CH— groups of which at least 30% are of the cis-configuration so as to obtain a modified polymer containing —CH=CH— groups of which at least 90% are of the trans-configuration, said process comprising treating at a temperature of −20° to 100°C. a 10 to 50% solution of said polymer in an inert organic solvent with a catalyst of

a. a tungsten hexachloride or tungsten hexafluoride,

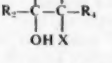
b. a compound of the formula $AlR_3$, $HalAlR_2$ or $Hal_2AlR$ wherein Hal is chlorine, bromine or iodine and R is alkyl or alkoxy having 1 to 12 carbon atoms and

c. an epoxide or a halogen alcohol,

the amount of (a) being 0.1 to 10 mmols per 100 g of polymer, the molar ratio of (a) to (b) being 1:0.2 to 1:20 and the molar ratio of (a) to (c) being 1:0.1 to 1:10, said epoxide being of the formula



wherein X is hydrogen, alkyl having 1 to 6 carbon atoms, phenyl, or benzyl and Y is hydrogen, alkyl having 1 to 6 carbon atoms, phenyl, benzyl, chloroalkyl having 1 to 6 carbon atoms or alkoxymethyl having 1 to 6 carbon atoms in the alkoxy moiety and said halogen alcohol being of the formula



wherein X is chlorine, bromine or iodine, $R_1$ and $R_2$ are each hydrogen or alkyl having 1 to 6 carbon atoms and $R_3$ and $R_4$ are each hydrogen, chlorine, bromine, iodine or alkyl having 1 to 6 carbon atoms.

3,920,774

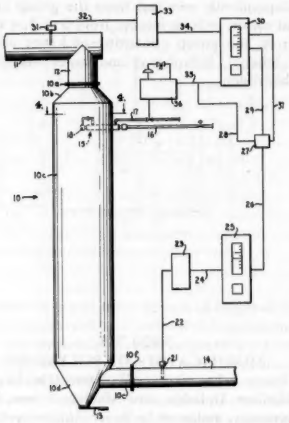
## EVAPORATIVE COOLER

Stanley A. Reigel, Overland Park, Kans., and Charles D. Doyle, Kansas City, Mo., assignors to Standard Havens, Inc., Kansas City, Mo.

Division of Ser. No. 304,076, Nov. 6, 1972, Pat. No. 3,842,615. This application Jan. 10, 1974, Ser. No. 432,319

Int. Cl.[2] C10K 1/06

U.S. Cl. 261—17 3 Claims



1. An evaporative cooler for cooling hot process gas by the vaporization of liquid water, said cooler comprising:

a vertical vessel having a radius R;

an inlet gas conduit connected to the top of said vessel for delivering hot process gas thereto;

an outlet gas duct connected to the bottom of said vessel for discharging process gas therefrom;

liquid spray means disposed in the upper region of said vessel for spraying liquid water into the vessel, said means including a nozzle emitting a cone-shape spray pattern characterized by an included cone angle Φ, said nozzle located from the center of said vessel no greater than the distance $r$ defined by the expression:

$r = R - 2\tan(\Phi/2)$

whereby contact of the spray pattern with the vessel is prevented in order to minimize condensation of the water.

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3,920,775

## FUEL INJECTOR

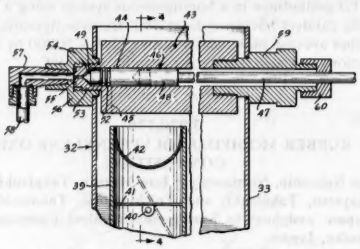
Anthony F. Greenfield, Baltimore, Md., assignor to Stanley Sollins, Baltimore, Md., a part interest

Filed Mar. 26, 1974, Ser. No. 455,031

Int. Cl.[2] F02M 19/04

U.S. Cl. 261—23 A 2 Claims

1. Apparatus for injecting a selected quantity of fuel into the air supply of an internal combustion engine to form a combustible mixture comprising a housing, a support member carried by said housing and having an axial bore extending substantially therethrough, one end of said support member having a fuel inlet port communicating with said bore, fuel supply means for supplying fuel to said inlet port, said support member having at least one elongated slot extending radially from said bore to the exterior thereof, a plunger slidably mounted for axial movement within said bore, a fin fixed to said plunger and slidably received within said slot, said fin completely closing the end of said slot adjacent to said inlet port when said plunger is positioned at said one end of said support member, and means for selectively moving said plunger axially of said bore so that fuel only is discharged from said inlet port and through a portion of said bore and said slot into the air flow, whereby the air supply for said engine flows through said housing and around said support member and movement of



said plunger varies the quantity of fuel entrained in the air flow.

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3,920,776

## DEVICE IN CONNECTION WITH DIAPHRAGM CARBURETTOR

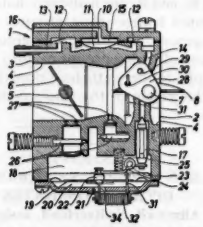
Fredrik Wildt-Persson, Taledsvagen 13, 43600 Askim, and Billy Nicklasson, Botekullsg 24, 41475 Goteborg, both of Sweden

Filed Oct. 11, 1973, Ser. No. 405,855

Claims priority, application Sweden, Oct. 24, 1972, 13696/72

Int. Cl.[2] F02M 17/04, 1/10

U.S. Cl. 261—35 3 Claims



1. In a diaphragm carburetor having a housing with a fuel mixture duct, liquid fuel chamber with fuel outlet to said duct, liquid fuel inlet valve opening into said chamber, a diaphgram closing one side of said chamber, means operable by said diaphgram for opening and closing said inlet valve, a choke valve mounted in said duct, said housing having an opening adjacent said diaphgram, a link having one end portion pivotally connected to said choke valve and having a resilient intermediate portion pivotally mounted on the exterior of said housing with the other end portion extending through said housing opening beneath said diaphgram whereby movement of said choke valve to its hot start position causes said link other end to move said diaphgram to open said inlet valve.

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3,920,777

## CARBURETOR FAST IDLE CAM THROTTLE POSITIONER

Robert S. Harrison, Grosse Ile; John D. Medrick, Plymouth, and Alvin P. Nowroski, Livonia, all of Mich., assignors to Ford Motor Company, Dearborn, Mich.

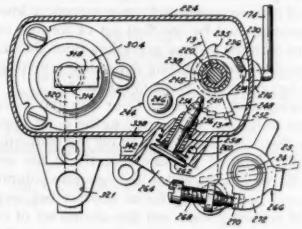
Filed Jan. 4, 1974, Ser. No. 430,969

Int. Cl.[2] F02M 3/06

U.S. Cl. 261—39 B 13 Claims

1. An idle speed control for controlling the idle speed of an internal combustion engine having a carburetor throttle plate variably movable between positions opening and closing an

air/fuel mixture conduit of a carburetor, the control means including abutment means operably fixed to the throttle plate, and stop means positioned in the path of movement of the abutment means and plate in one direction, the stop means including thermally sensitive means for moving the stop means to various positions in response to changes in temperature, the stop means having a cam profiled surface engagable by the abutment means, whereby movement of the stop means by the thermally sensitive means varies the stopped position of the



abutment means and thereby the throttle plate idle speed position, and movable means movable during engine start-up operations an incremental distance that varies as a function of the change in temperature of the temperature sensitive means to position the abutment means an equal distance away from the cam surface regardless of the position of the cam surface relative to the abutment means to open the throttle plate farther than the idle speed position called for by that portion of the cam surface normally engaged by the abutment means for the prevailing temperature level.

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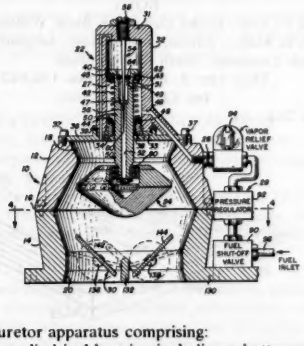
**3,920,778**
**CARBURETOR APPARATUS HAVING AN IMPROVED FUEL METERING ARRANGEMENT**
**John De Rugeris, 695 Kenneth Ave., Campbell, Calif. 95008**
**Filed June 26, 1974, Ser. No. 483,122**
**Int. Cl.[2] F02M** *9/08*
**U.S. Cl. 261—39 D** **7 Claims**



**1.** A carburetor apparatus comprising:

a generally cylindrical housing including a bottom opening and a split butterfly valve which covers said bottom opening, said split butterfly valve including a central support extending diametrically across said bottom opening, two rotatable shafts, which extend substantially parallel to said central support on opposite sides thereof, two semicircularly-shaped covering portions which are secured to said respective shafts, crank means connected to said shafts for coupling the rotation of said shafts together, and throttle means coupled to one of said shafts and operative to selectively rotate said one shaft from a closed position, wherein said semicircular coverings are disposed across said bottom opening to an open position, wherein said semicircular coverings are only partially disposed across said bottom opening so as to define two central openings and two circumferential openings;

a nozzle disposed within said housing and rotatable about an axis coincident with that of said housing, said nozzle being movable along said axis between an upper position and a lower position in response to the flow of air through said housing;

support means for rotatably supporting said nozzle, said support means including a tubularly-shaped member having an axial passageway formed therein coincident with said axis, said support means including guide means for permitting said tubular member to move along said axis with said nozzle and means for biasing said tubular member in the direction of said upper position, said tubular member having an inlet to said passageway provided near one end and having said nozzle rotatably affixed to said other end;

means disposed along said passageway between said inlet and said other end forming a valve seat;

a valve needle disposed along said axis and extending into said passageway through said one end, said needle cooperating with said valve seat to form a valve for throttling the flow of fuel through said passageway as said nozzle moves between said upper and lower positions; and

means affixed to said housing for selectively positioning said valve needle along said axis, the position of said needle along said axis being operative to calibrate the fuel throttling for particular environmental conditions and said central and circumferential openings providing a more even distribution of the blend of air and fuel within the housing, thereby to maintain atomization of the fuel.

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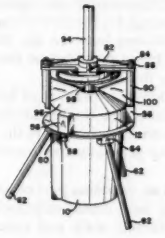
**3,920,779**
**SUBMERSIBLE AERATOR**
**Thomas G. Abele, Dayton, Ohio, assignor to Tait Inc., Dayton, Ohio**
**Filed Dec. 17, 1973, Ser. No. 425,491**
**Int. Cl.[2] B01F** *3/04*
**U.S. Cl. 261—87** **17 Claims**



**13.** A submersible aerator comprising:

a. an impeller including a plurality of outwardly projecting vanes,

b. said vanes extending substantially spirally outwardly from adjacent the center of said impeller toward the outer periphery thereof,

c. means for rotating said impeller about an axis substantially coincident with said center thereof in a direction such that outer ends of said vanes constitute trailing ends thereof,

d. a shroud plate mounted above said vanes and having an opening formed therethrough substantially centrally thereof,

e. said shroud plate having a planar lower surface,

f. said shroud plate lower surface being disposed above and in closely spaced relationship to said vanes with said

vanes moving across said lower surface of said shroud plate as said impeller is rotated about said axis,

g. said shroud plate lower surface including a centrally disposed portion positioned above and covering a central portion of said impeller,

h. said shroud plate having a total lower surface area less than the total area of said impeller beneath said shroud plate, and

i. intake means for feeding gas through said opening in said shroud plate to said impeller at substantially said center thereof.

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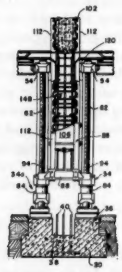
## 3,920,780
## METHOD OF ERECTING A MULTI-STORY BUILDING AND APPARATUS THEREFOR

**Peter M. Vanderklaauw, Miami, Fla., assignor to Research Corporation, New York, N.Y.**

**Division of Ser. No. 279,053, Oct. 9, 1972, Pat. No. 3,831,902. This application Feb. 5, 1974, Ser. No. 439,945**

**Int. Cl.[2] E04B *1/16***

**U.S. Cl. 264—33** **4 Claims**



1. A method of erecting from ground level upward a multi-story concrete building having vertically spaced superposed concrete floor slabs formed in individual successive fashion on a horizontal platform disposed at the foundation level with the platform having openings for the flow of concrete to form load bearing concrete columns between the floor slabs and with foundation footings being provided on the ground below the openings comprising the steps of:

a. vertically positioning a first set of hollow load carrying auxiliary columns above the foundation footings in vertical alignment with the openings in the platform with said columns defining generally coextensive concrete retaining walls;

b. establishing on an opposing pair of said concrete retaining walls means for forming interlocking facial contact between the retaining walls and concrete to be poured therein;

c. pouring concrete over the platform and into the concrete retaining walls established by virture of each of the auxiliary load bearing columns to monolithically form a floor slab on the platform and a first set of depending supporting concrete columns in the auxiliary columns;

d. allowing the floor slab and its supporting columns to harden sufficiently to the point that the floor slab can be raised off the platform;

e. applying lifting pressure from the foundation footings directly to the auxiliary columns and indirectly to the concrete columns through interlocking facial contact between the said retaining walls and the concrete columns and therethrough to the floor slab and raising the floor slab a full floor level height above the platform;

f. supporting the raised auxiliary columns with their lower ends adjacent the platform while releasing the lifting pressure;

g. inserting under and connecting to the raised and supported first set of auxiliary columns a second set of auxiliary columns with coextensive concrete retaining walls with a space equal to the thickness of a floor slab therebetween;

h. establishing on an opposing pair of said concrete retaining walls means for forming interlocking facial contact between the retaining walls and concrete to be poured therein;

i. pouring concrete over the platform and into the second set of retaining walls to form a successive lower floor slab interconnected by the first set of formed concrete columns with the formed preceding floor slab and to form a second set of supporting depending concrete columns in the second set of auxiliary columns;

j. allowing such successive floor slab and its concrete columns to harden sufficiently to the point that the successive floor slab can be raised off the platform;

k. applying lifting pressure directly to the second set of auxiliary columns and to the concrete columns indirectly through interlocking facial contact between such concrete retaining walls and the second set of concrete columns and therethrough to the successive floor slab and through the connection between the second set of auxiliary columns and the first set of auxiliary columns to the first set of concrete columns and the supported preceding floor slab to raise the successive floor slab a full floor level above the platform while raising the preceding floor slab a height of a full floor level;

l. continuing to pour, harden, lift and support subsequent floor slabs and concrete columns;

m. stripping the concrete retaining walls of the auxiliary columns from upper concrete columns that have hardened to a strength to support the first formed upper part of the building; and

n. rotating such concrete retaining walls of the auxiliary columns to positions at ground level for placement under the platform so that previously used auxiliary columns with the concrete retaining walls are recycled for use as further sets of auxiliary columns with concrete retaining walls in the erection of the building.

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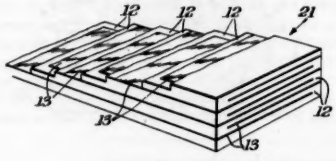
## 3,920,781
## METHOD OF FORMING A CERAMIC DIELECTRIC BODY

**Nicholas G. Eror, Banks, Oreg.; Ian Burn, Williamstown, and Galeb H. Maher, Adams, both of Mass., assignors to Sprague Electric Company, North Adams, Mass.**

**Filed Apr. 2, 1971, Ser. No. 130,692**

**Int. Cl.[2] C04B *35/46***

**U.S. Cl. 264—61** **5 Claims**




1. A method of fabricating a high resistivity ceramic dielectric body including the steps of forming a slip suspension of a barium titanate ceramic containing acceptor ions selected from the group consisting of oxides of (1) aluminum, boron, beryllium, cobalt, gallium, indium, zinc, chromium, iron, magnesium, nickel, lithium, germanium, ytterbium, and manganese, and (2) sodium, potassium and copper and an organic binder, forming a plurality of layers of said ceramic and interleaving at least one base metal electrode selected from the group consisting of nickel, cobalt, iron and alloys thereof and

firing said layers, wherein the improvement comprises balancing the large cation/small cation ratio of said ceramic to above 0.95 and no more than 1.0 by adding at least one cation replacement ion selected from the group consisting of $Ca^{+2}$, $Sr^{+2}$, $Ba^{+2}$, $Mg^{+2}$, $Ti^{+4}$, $Zr^{+4}$ and $Hf^{+4}$, and said firing is in the temperature range of 1,000°C to 1,400°C in a mixture of at least two gases, said mixture having a partial oxygen pressure not exceeding $10^{-7}$ atmospheres thereby producing a ceramic dielectric body that has at least one portion having a resistance capacity product of at least 50 MΩ μf at above 100°C.

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**3,920,782**

## SHARKSKIN

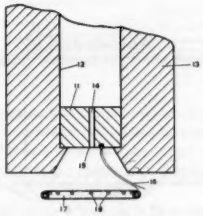
**Frederic Neil Cogswell, Welwyn Garden City, England, assignor to Imperial Chemical Industries Limited, London, England**

**Filed July 3, 1973, Ser. No. 376,205**

**Claims priority, application United Kingdom, July 12, 1972, 32559/72**

**Int. Cl.² B29C** *17/07*; **B29D** *23/03*

**U.S. Cl. 264—98** **17 Claims**



**9.** A method for reducing the incidence of sharkskin during extrusion of a molten sharkskin-forming polymeric material having a narrow molecular weight distribution through a die under conditions of extrusion velocity and melt temperature which would otherwise produce sharkskin, which method comprises extruding the material through a tubular die, cooling an outer layer only of the extruding material so that it emerges from the extruder die with the outer layer at a temperature above its solidification temperature but which is sufficiently below the temperature of maximum sharkskin to effect the desired reduction, and thereafter subdividing said extrudate to form parisons for blow moulding.

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**3,920,783**

## EXTRUSION MOULDING METHOD

**Haruichi Hara, Toyonaka, and Akiyoshi Adachi, Suita, both of Japan, assignors to Nippon Shokubai Kagaku Kogyo Co., Ltd., Osaka, Japan**

**Continuation-in-part of Ser. No. 867,326, Oct. 17, 1969, abandoned. This application Sept. 14, 1973, Ser. No. 397,284**

**Claims priority, application Japan, June 27, 1977, 41-41403**

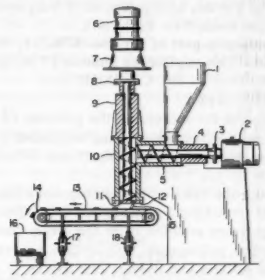
**Int. Cl. B29b** *1/02*

**U.S. Cl. 264—118** **2 Claims**

**1.** A method of producing pellets for catalysts, carriers and adsorbents, wherein the pellets have substantially constant dimensions, and wherein the pellets have diameters in the range of 2 mm – 20 mm, lengths in the range of 2.4 mm – 30 mm, and length to diameter ratios in the range of 1.2 – 5:1; said method comprising the steps of:

forming a kneaded mass which is 40 to 90% water-insoluble powder by weight in which the powder has particles at least 80% of which have a particle size of not more than 300 mesh, said kneaded mass also including 60 – 10% by weight of an aqueous solution of a binder, inorganic salt, organic salt or alcohol and said kneaded mass having a brittleness such that when the mass is extruded through a nozzle hole as a straight rod 5 mm in diameter and 30 mm in length, and is subjected at an unsupported end to a normal force applied at a linear velocity of 1 cm/sec, the rod breaks at the rim of the hole when the rod inclines 5° to 45° with respect to the axis thereof;

extruding the kneaded mass at a predetermined speed through a plurality of nozzle holes defined by rims having internal diameters in the range of 2mm – 20 mm, and arranged so that no two nozzles are aligned with respect



to a direction normal to the axis of extrusion to form rod-like extrudates;

moving a flat surface having frictional characteristics similar to rubber parallel to said direction at a distance of 2.4 mm – 30 mm from the nozzles and at a speed greater than said predetermined speed of extrusion; and

impinging the rod-like extrudates against the moving flat surface to break the extrudates off at the rims of said nozzle holes as the impingement occurs.

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**3,920,784**

## METHOD FOR PRODUCING CRIMPED FIBERS

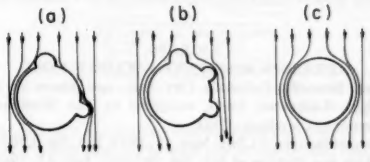
**Junyo Nakagawa, Kurashiki; Yoshikata Ohno, Okayama; Tamemaru Esaki, Kurashiki, and Keizo Ueda, Kobe, all of Japan, assignors to Kuraray Co. Ltd., Japan**

**Filed Aug. 29, 1972, Ser. No. 284,465**

**Claims priority, application Japan, Nov. 25, 1971, 46-94949**

**Int. Cl.² D01D** *5/22*

**U.S. Cl. 264—168** **2 Claims**




**1.** A method of producing fibers and filaments by spinning a melt of a fiber-forming organic linear synthetic polymer through a spinneret having a number of orifices, characterized in that each orifice comprises a substantially circular main hole and two or three subholes having smaller sizes than the main hole and provided in proximity to the surrounding of the main hole, said subholes at least containing a standard subhole and an adjacent subhole, the standard subhole having an area not smaller than that of the other subhole, the central angle $\alpha'$ formed between the standard subhole and the adjacent subhole with respect to the center of the main hole being $45° \leq \alpha' \leq 135°$, and when the number of the subholes is three, these three subholes being provided in proximity to one semicircumference of the main hole; a cooling air is blown against the filaments extruded from a spinneret at substantially right angles to the individual filaments within a region 45 to 380 mm below the spinneret face, the direction of blowing the cold

air being in substantial correspondence with the direction connecting the center of the main hole with that of the standard subhole.

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3,920,785

## PROCESS FOR INCREASING THE POROSITY OF OPENCELLED MICROPOROUS FILM

**Melvin L. Druin, West Orange; John T. Loft, Springfield, and Steven G. Plovan, Livingston, all of N.J., assignors to Celanese Corporation, New York, N.Y.**

**Continuation-in-part of Ser. No. 876,511, Nov. 13, 1969, abandoned. This application June 4, 1970, Ser. No. 43,608**

**Int. Cl.[2] D01D** *5/12*

**U.S. Cl. 264—210 R** **6 Claims**

1. A process for increasing the porosity of an open-celled microporous polymer film having a reduced bulk density and a pore size less than 5000 Angstroms, which process comprises:

a. forming the open-celled microporous film by

i. cold stretching a non-porous, crystalline, elastic film of a polymer selected from the group consisting of polyolefins, polyacetals, polyamides, polyesters, polyalkylene sulfides and polyarylene oxides, at a film temperature below the temperature at which the film begins to melt, until porous surface regions perpendicular to the stretch direction are formed, the non-porous elastic film having a crystallinity of above about 20 percent, and an elastic recovery from a 50 percent strain of at least 40 percent at 25°C.,

ii. hot stretching the resulting cold-stretched film at a film temperature in the range of between about the temperature at which the film begins to melt and the fusion temperature of the film until pore spaces elongated parallel to the stretch direction are formed, said cold and hot stretching steps conducted at an extension ratio between 0.10:1 and 0.99:1 to a total stretch of 10 to 300 percent of the original length of the elastic film,

iii. and therafter heating the resulting microporous film under tension; and

b. contacting the open-celled microporous film with a liquid organic compound at 10°C. or above whereby the porosity is increased, the liquid organic compound having a normal boiling point less than 150°C. and selected from the group consisting of aliphatic and aromatic hydrocarbons, chlorinated aliphatic hydrocarbons, aliphatic ketones, monohydric aliphatic alcohols and aliphatic ethers, the members of the group having up to 1 carbon atoms.

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3,920,786

## ABRASION RESISTANT FLEXIBLE HOSE

**William Brunelle, Columbia City, Ind., and James W. Cartwright, Columbus, Ohio, assignors to The Weatherhead Company, Cleveland, Ohio**

**Division of Ser. No. 91,305, Nov. 11, 1970, Pat. No. 3,707,032, which is a division of Ser. No. 793,304, Jan. 23, 1969, abandoned. This application July 17, 1972, Ser. No. 272,129**

**Int. Cl.[2] B29H** *9/10*

**U.S. Cl. 264—251** **6 Claims**

1. A method of forming an abrasion resistant hose assembly comprising selecting a length of flexible hose having a rubber-like outer surface of predetermined rigidity, placing said hose in a mold formed to receive a portion of said hose interspacing the ends of the hose and including a plurality of chambers extending circumferentially around said hose in said mold, filling said chambers with a liquid plastic material having a predetermined heat shrinkage factor at a temperature above the melting point of said plastic, cooling said plastic material and hardening said plastic material to a greater rigidity than said hose and shrinking said plastic material about said hose upon said hardening, and removing said hose from said mold with the solid plastic material forming shaped bumper members on the surface of said hose, each of said bumper members retaining the shape of the chamber in which it was formed and gripping the external surface of said hose with a shrink fit resulting from the thermal contraction of said plastic material around the outer surface of said hose to prevent relative axial movement of said bumper members with respect to the hose.

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3,920,787

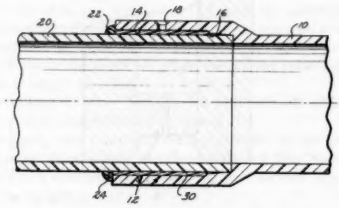
## JOINT BETWEEN TUBULAR PLASTIC ARTICLES AND METHOD OF FORMING

**Jon J. McDowell, North Hollywood, and James J. Blumenkranz, Hollywood, both of Calif., assignors to R & G Sloane Manufacturing Company, Inc., Woodland Hills, Calif.**

**Continuation of Ser. No. 159,334, July 2, 1971, abandoned. This application Dec. 12, 1973, Ser. No. 426,681**

**Int. Cl.[2] F16L** *47/02*

**U.S. Cl. 264—263** **4 Claims**



1. In a method of joining plastic tubular articles wherein a first tubular article has a socket in one end thereof, said socket having an outer portion and a reduced inner portion, an injection hole is provided in said first article and extends into said outer socket portion, and the end portion of a second article is positioned in said socket in slidable engagement with the inner socket portion, the end portion of the second article having an outer diameter that is less than the diameter of said outer socket portion so as to define an annular space therebetween in communication with said injection hole; the improvement comprising: positioning an annular sealing member in axial abutting contact against said one end face of the first article and in contact with the adjacent portion of the second article to seal said annular space between said articles said sealing member having a single, open vent hole therethrough in communication with said annular space, and spacing said single vent hole in circumferentially at an angle approximately 180° from said injection hole, and injecting a substantially nonshrink liquid adhesive curable to a solid through said injection hole to fill said annular space and form a leak-proof joint between said first and second articles, said vent hole venting air from the annular space as the adhesive is injected therein.

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3,920,788

## PREPARATION OF URANIUM COMPOUNDS

**Henri Mercier, Gardanne, and Robert Jean, Aix-en-Provence, both of France, assignors to Pechiney Ugine Kuhlmann, Lyon, France**

**Filed Sept. 25, 1972, Ser. No. 292,086**

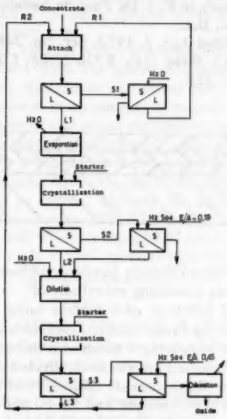
**Claims priority, application France, Sept. 28, 1971, 71.34751**

**Int. Cl. C01g** *43/00*

**U.S. Cl. 423—18** **5 Claims**

1. A method for the production of uranium compounds in a high state of purity comprising the steps of contacting a uranium-bearing material with an aqueous solution of sulfuric

acid, separating undissolved solids to leave a first leach solution, adjusting the ratio of water to free sulfuric acid in the first leach solution to within the range of 0.16 to 0.26 to precipitate impurities from the first leach solution, removing




the precipitate formed to leave a second leach solution, diluting the second leach solution with water to adjust the ratio of water to free sulfuric acid to within the range of 0.35 to 0.50 and separating the uranium compounds therefrom.

## 3,920,789
## SEPARATION OF PGM'S FROM EACH OTHER AND FROM GOLD

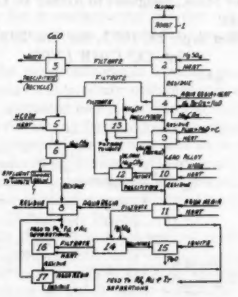
**Willem Hubert Pittie, Roodepoort; Gerhardus Overbeek, Florida, and Kingsley Ferguson Doig, Johannesburg, all of South Africa, assignors to Swarsab Mining, Exploration & Development (Proprietary) Limited, Johannesburg, South Africa**

**Continuation-in-part of Ser. No. 384,823, Aug. 2, 1973. This application Jan. 30, 1975, Ser. No. 545,518**

**Claims priority, application South Africa, Aug. 10, 1972, 72/5489**

**Int. Cl.[2] C01G** *7/00, 55/00*

**U.S. Cl. 423—22** **7 Claims**



1. A process for treating a mixture of platinum group metals and gold wherein the mixture comprises rhodium together with at least one other metal selected from the group consisting of platinum, palladium and gold, the mixture optionally including iridium and/or ruthenium, said process comprising the steps of:-

a. treating the metals present to form either a halide or perchlorate salt thereof,

b. igniting the resultant salt at a temperature of from 575° to 625° C for a period of time sufficient to enable said salt to decompose, and

c. subsequently subjecting thus-produced ignition residue to an aqua regia leach to dissolve platinum, palladium and gold present in the residue and to leave any rhodium, iridium and ruthenium in undissolved condition.

7. A process for separating at least one member selected from the group consisting of rhodium, iridium and ruthenium from a solution containing same and at least one member selected from the group consisting of gold, platinum and palladium which comprises:

I. evaporating the solution to dryness to obtain a residue,

II. rendering any rhodium in the residue aqua-regia insoluble by heating said residue at a temperature of from about 575° to 625° C, and

III. leaching thus-heated residue with aqua regia to remove from the residue any gold, platinum and palladium therein and to leave in said thus-leached residue initially-contained rhodium, iridium and ruthenium in an aqua-regia-insoluble form.

## 3,920,790
## SEPARATION AND PURIFICATION OF PLATINUM GROUP METALS AND GOLD

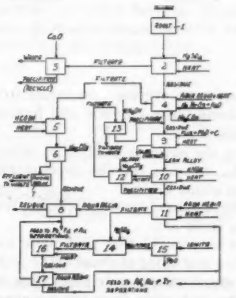
**Willem Hubert Pittie, Roodepoort; Gerhardus Overbeek, Florida, and Kingsley Ferguson Doig, Johannesburg, all of South Africa, assignors to Swarsab Mining, Exploration & Development Company (Proprietary) Limited, Johannesburg, South Africa**

**Filed Aug. 2, 1973, Ser. No. 384,823**

**Claims priority, application South Africa, Aug. 10, 1972, 5489**

**Int. Cl.[2] C01G** *7/00, 55/00*

**U.S. Cl. 423—22** **16 Claims**



1. A process for separating and purifying a mixture of PGMs and gold, which includes at least one of the PGMs, rhodium, ruthenium and iridium, comprising:

A. fusing the mixture of PGMs with a lead compound and a flux,

B. casting the fused mixture into an alloy of PGMs, gold and lead,

C. removing slag formed while preparing the alloy,

D. subjecting the alloy

1. to a nitric acid leach to remove lead therefrom and subjecting the resulting residue thereof

2. to an aqua regia leach to obtain

a. a leach solution containing any platinum and palladium present in the mixture, gold and some rhodium, when the latter is present in said mixture, and

b. a residue containing the PGMs ruthenium and iridium present and some rhodium, when the latter is present in said mixture,

E. evaporating the aqua regia leach solution to dryness to obtain a residue,

F. igniting the residue at a temperature of from about 575°to 625° C, and

G. leaching thus-ignited residue with aqua regia to remove from the residue any gold, platinum and palladium therein and to leave in said thus-leached residue initially-contained rhodium, iridium and ruthenium in an aqua-regia-insoluble form.

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**3,920,791**

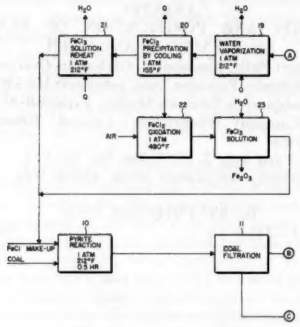
## RECOVERY OF FERRIC CHLORIDE AND FERRIC OXIDE FROM IRON CHLORIDE SOLUTIONS

**Robert A. Meyers, Encino, Calif., assignor to TRW Inc., Redondo Beach, Calif.**

**Continuation-in-part of Ser. No. 116,262, Feb. 17, 1971, abandoned, Division of Ser. No. 163,893, July 19, 1971, Pat. No. 3,768,988. This application Oct. 30, 1973, Ser. No. 411,140**

**Int. Cl.² C01G** *49/10, 49/06*

**U.S. Cl. 423—140** **1 Claim**




1. A process for recovering iron values from an aqueous solution containing ferric chloride and ferrous chloride ion which comprises:

concentrating the aqueous solution by water vaporization; cooling the solution thereby precipitating the ferrous chloride at about 155°F;

separating the ferrous chloride precipitate from the solution containing ferric ion;

oxidizing the ferrous chloride precipitate with air to ferric chloride and iron oxide at about 480°F and 1 atmosphere; dissolving the ferric chloride precipitate in water; and

separating the iron oxide from the aqueous solution containing the ferric chloride.

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**3,920,792**

## STABLE ANTACID COMPOSITIONS BASED ON ALUMINUM HYDROXIDE AND CONTAINING HYDROXY MAGNESIUM AMINOACETATE AND PROCESS FOR PREPARING THE SAME

**Stewart M. Beekman, P. O. Box 277, Signal Mountain, Tenn. 37377**

**Filed May 8, 1972, Ser. No. 251,062**

**Int. Cl.² A61K** *33/10*

**U.S. Cl. 424—156** **8 Claims**

1. An antacid composition having a high storage stability and capable of rapidly increasing the pH of gastric juice to within the range from about 2.5 to 5, and of maintaining the pH within this range for at least two hours, comprising a co-dried blend of a highly reactive hydrous gelatinous aluminum hydroxide gel containing carbonate with hydroxy magnesium aminoacetate in which the proportions of aluminum hydroxide and hydroxy magnesium aminoacetate provide a molecular ratio Al:Mg within the range from about 4:1 to about 0.5:1.

**3,920,793**

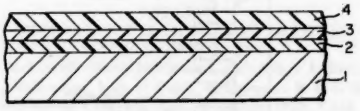
## CORROSION-RESISTANT PERFLUOROCARBON POLYMER COATED METAL SUBSTRATE AND PROCESS FOR PREPARING THE SAME

**John Teti, and Michael D. Yallourakis, both of Wilmington, Del., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.**

**Filed Apr. 2, 1973, Ser. No. 346,867**

**Int. Cl. B44d** *1/36;* **B32b** *15/08;* **C08f** *45/24*

**U.S. Cl. 428—215** **12 Claims**




1. A corrosion-resistant perfluorocarbon polymer coated metal substrate consisting essentially of

A. a metal substrate of a ferrous metal or an aluminum metal having firmly adhered thereto a layer of

B. a corrosion-retardant finish of a thermally stable binder having dispersed therein finely divided particles of zinc in which the finish consists essentially of 5–50% by weight of an alkyl polysilicate and 95–50 per cent of finely divided zinc and having adhered thereto a primer layer of

C. a perfluorocarbon polymer blended with an adhesion promoter and a corrosion-protective agent in which the perfluorocarbon polymer is either polytetrafluoroethylene or a copolymer of tetrafluoroethylene and hexafluoropropylene; and being topcoated with a coalesced layer of

D. a perfluorocarbon polymer selected from the group consisting of polyvinylidene fluoride, polytetrafluoroethylene, a copolymer of tetrafluoroethylene and hexafluoropropylene, polyvinyl fluoride, a copolymer of tetrafluoroethylene and perfluoro-propyl-vinyl ether, a copolymer of tetrafluoroethylene and fluorinated polyethylene, a chlorotrifluoroethylene polymer, and an ethylene chlorotetrafluoroethylene polymer.

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**3,920,794**

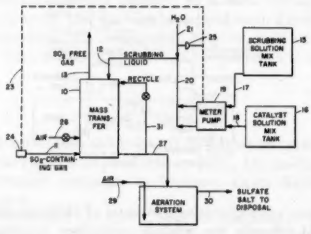
## METHOD FOR REMOVAL OF SULFUR DIOXIDE FROM GASES

**Charles R. La Mantia, Lexington, and James I. Stevens, Bedford, both of Mass., assignors to Arthur D. Little, Inc., Cambridge, Mass.**

**Filed Sept. 28, 1972, Ser. No. 293,021**

**Int. Cl.² C01B** *17/00*

**U.S. Cl. 423—242** **5 Claims**




1. A method of removing sulfur dioxide from a gas mixture comprising the products of a combustion process, comprising the steps of

a. contacting said gas mixture with a scrubbing liquid consisting essentially of an aqueous solution of

1. an inorganic reactant containing sodium ions which form a water-soluble sulfite salt with said sulfur dioxide, said sulfite salt being oxidizable to the corresponding sulfate salt, the quantity of said inorganic reactant being that required to provide an essentially stoichiometric amount of the sodium ions of said reactant to react with all of the sulfur dioxide to be removed from said gas mixture, and
2. an oxidation catalyst which is a water-soluble salt of a metal selected from the group consisting of cobalt, copper, iron, manganese and nickel and a strong mineral acid present in an amount to provide at least one part by weight of said metal per million parts by weight of said aqueous scrubbing liquid; and

b. simultaneously with said contacting, providing sufficient oxygen in said gas mixture to oxidize the major part of the sulfite formed to sulfate, whereby the sulfur dioxide in said gas mixture reacts with said inorganic reactant to form a sulfite salt which is oxidized to the corresponding sulfate salt directly in said aqueous scrubbing liquid.

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## 3,920,795
## STABILIZATION OF SLUDGE SLURRIES

**Joseph G. Selmeczi; Donald H. Marlin, both of Pittsburgh, and Daniel W. Kestner, Coraopolis, all of Pa., assignors to Dravo Corporation, Pittsburgh, Pa.**

**Filed Mar. 8, 1973, Ser. No. 339,151**
**Int. Cl.[2] C01B** *17/00;* **E02D** *3/00*
**U.S. Cl. 423—242** **11 Claims**

1. The method of stabilizing the solids content of an aqueous sludge slurry of predominantly inorganic solids consisting essentially of calcium sulfates and calcium sulfites, wherein the aqueous sludge slurry comprises 25–60% solids and correspondingly 75–40% aqueous liquor, comprising; adding to said aqueous sludge slurry an amount of between 1–20 percent, based upon the solids content of the slurry, of a granulated blast furnace slag, whereby a stabilized mass of said solids is formed upon setting of said solids.

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## 3,920,796
## METHOD OF PREPARING PURIFIED PHOSPHATES FROM IMPURE PHOSPHORIC ACID

**Richard C. Sheridan, Sheffield, Ala., assignor to Tennessee Valley Authority, Muscle Shoals, Ala.**

**Continuation of Ser. No. 335,337, Feb. 23, 1973, Pat. No. 921,024. This application Aug. 31, 1973, Ser. No. 393,413**
**Int. Cl. C01b** *15/16, 25/26*
**U.S. Cl. 423—313** **7 Claims**

1. A process for manufacturing purified alkali metal or ammonium orthophosphates, which process comprises the steps of:

1. mixing in the mole ratio range from about 1:2 to about 3.25:1 impure wet-process orthophosphoric acid and melamine, calculated as $P_2O_5$:melamine, said orthophosphoric acid containing from about 1 to about 10 percent by weight congeneric impurities and from about 10 to about 60 percent by weight $P_2O_5$ to form in a mother liquor crystals of melamine orthophosphate;
2. separating the so formed crystals of melamine orthophosphate from said mother liquor;
3. subsequently reacting said crystals of melamine orthophosphate separated from said mother liquor with aqueous solution, said aqueous solution selected from the group consisting of alkali metal hydroxide, ammonium hydroxide, and mixtures thereof, in the mole ratio range of hydroxide:melamine orthophosphate of about 1:1 to about 8:1; and
4. separating the resulting crystals of melamine precipitated by the reaction of said hydroxide with said melamine orthophosphate in step (3) supra for recycle to step (1) supra, and recovering the resulting purified alkali or ammonium orthophosphate from the filtrate formed in step (3) supra, as product.

2. A process for manufacturing purified alkali metal or ammonium pyrophosphates, which process comprises the steps of:

1. mixing in the mole ratio range from about 1:2 to about 3.25:1 impure wet-process orthophosphoric acid and melamine, calculated as $P_2O_5$:melamine, said orthophosphoric acid containing from about 1 to about 10 percent by weight congeneric impurities and from about 10 to about 60 percent by weight $P_2O_5$ to form in mother liquor crystals of melamine orthophosphate;
2. separating the so formed crystals of melamine orthophosphate from said mother liquor;
3. heating said recovered crystals of melamine orthophosphate to a temperature in the range from about 170°C to about 325°C for a period of time ranging from about 4400 minutes to about 1 minute, thereby converting said crystals of melamine orthophosphate to resulting solid melamine pyrophosphate;
4. subsequently reacting said resulting melamine pyrophosphate with aqueous solution selected from the group consisting of alkali metal hydroxide, ammonium hydroxide, and mixtures thereof, in the mole ratio range of hydroxide:melamine pyrophosphate of about 2:1 to about 10:1; and
5. separating the resulting crystals of melamine precipitated by the reaction of said hydroxide with said melamine pyrophosphate in step (3) supra for recycle to step (1) supra, and recovering the resulting purified alkali or ammonium pyrophosphate from the filtrate formed in step (3) supra, as product.

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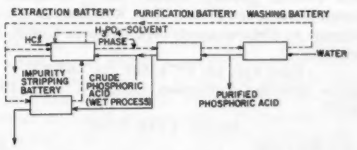
## 3,920,797
## PHOSPHORIC ACID PURIFICATION

**Itaru Toshimitsu; Sakumi Fujii, and Taketoshi Nakajima, all of Shin-nanyo, Japan, assignors to Toyo Sodo Manufacturing Co., Ltd., Japan**

**Filed Mar. 21, 1973, Ser. No. 343,430**
**Claims priority, application Japan, June 10, 1972, 47-58008**
**Int. Cl.[2] C01B** *25/16*
**U.S. Cl. 423—321** **10 Claims**




1. A process for purifying a phosphoric acid solution containing zinc compound impurities obtained by a wet process method, which comprises:

extracting crude phosphoric acid with a solvent having limited water solubility selected from the group consisting of aliphatic alcohols, alkylphosphates, ketones, esters and ethers so as to obtain a phosphoric acid-containing solvent phase containing 0.2 – 10 g/l of chloride ion and an aqueous phosphoric acid solution;

controlling the chloride ion concentration in said phosphoric acidcontaining solvent phase to less than 10 g/l by adding chloride ion thereto:

purifying the phosphoric acid-containing solvent phase with a second aqueous phosphoric acid solution characterized by a chloride ion concentration of 20 – 0.01 g/l in amounts such that the amount of aqueous phosphoric acid solution is 0.03 – 0.3 times the amount of phosphoric acid -containing solvent solution so as to substantially transfer the zinc compound impurities from the solvent phase to the aqueous phosphoric acid solution;

washing the phosphoric acid from the resulting solvent phase in the purification step with water so as to obtain a purified phosphoric acid; and

removing zinc compound impurities by withdrawing said aqueous phosphoric acid solution of the extraction step.

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## 3,920,798
## ZEOLITE Y SYNTHESIS

**Willis W. Weber, South Salem, N.Y., assignor to Union Carbide Corporation, New York, N.Y.**

**Filed May 8, 1973, Ser. No. 358,358**
**Int. Cl.[2] C01B** *33/28*
**U.S. Cl. 423—329** **1 Claim**

1. Process for the production of Zeolite Y which comprises (a) providing in a reaction vessel a homogeneous aqueous aluminosilicate mixture, the source of silica in said reaction mixture being a solid reactive amorphous silica, said reaction mixture having a composition expressed in terms of oxide-mole ratios within the range:

| | |
|---|---|
| $Na_2O/SiO_2$ | 0.30–0.36 |
| $SiO_2/Al_2O_3$ | 8.0–11 |
| $H_2O/Na_2O$ | 16–35 |

(b) maintaining the said reaction mixture at a temperature within the range of **95°F** to **160°F** for a period of from about **6** to **15** hours; (c) thereafter injecting steam into the reaction mixture in an amount and at a temperature sufficient to raise the temperature of the reaction mixture to the range of **240°F** to **300°F** while increasing the water content of the reaction mixture not more than **15%** based on the weight of the water originally present; (d) maintaining for a period of from **4** to **20** hours under autogeneous pressure the reaction mixture at a temperature of from **240°F** to **300°F**; (e) rapidly decreasing the pressure over said reaction mass from autogeneous to atmospheric whereby a temperature decrease in the reaction mass of at least about **35°F** is obtained over a period not exceeding **10** minutes.

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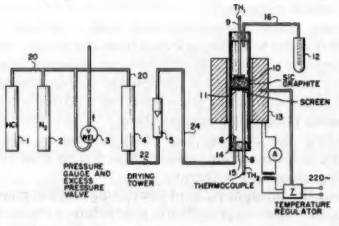
## 3,920,799
## PROCESS FOR PREPARING SILICON TETRACHLORIDE FROM SILICON CARBIDE WITH HYDROGEN CHLORIDE

**Günter Wiebke, Munich; Günter Stohr, Kempten; Günter Kratel, Durach, and Johann Kral, Kempten, all of Germany, assignors to Elektroschmelzwerk Kempten GmbH, Munich, Germany**

**Filed Apr. 18, 1974, Ser. No. 462,072**
**Claims priority, application Germany, Apr. 19, 1973, 2319995**
**Int. Cl.[2] C01B** *33/08*
**U.S. Cl. 423—341** **2 Claims**

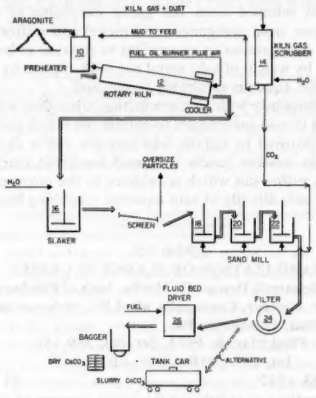



1. In a process of preparing silicon tetrachloride from silicon carbide and silicon carbide-containing mixtures by reacting with hydrogen chloride the improvement, which consists in carrying out the reaction in the presence of a member of the group consisting of cobalt chloride, nickel chloride and a mixture of both, at temperatures ranging from 400°C to 1000°C.

## 3,920,800
## PRODUCTION OF PURIFIED CALCIUM CARBONATE

**Dwight L. Harris, Yardley, Pa., assignor to Cyprus Mines Corporation, Trenton, N.J.**

**Filed Oct. 12, 1973, Ser. No. 405,843**
**Int. Cl.[2] C01F** *11/18*
**U.S. Cl. 423—432** **2 Claims**




1. In the process for producing calcium carbonate including the generation of carbonate ions in a reaction zone for reaction with calcium ions in an aqueous slurry of calcium hydroxide contained in said zone, the improvement which comprises: generating said carbonate ions by addition of carbon dioxide gas into said slurry for a period not exceeding twenty minutes until the pH of said slurry is in the range of from 9.9 to 11.0, said carbonation zone including particulate grinding media comprising grinding balls having diameters of the order of 1mm.,

said calcium hydroxide component of said slurry being in the form of fine particles having a particle size not exceeding 75 micro meters,

maintaining said slurry at a temperature in the range of from 30°C. to about 80°C. throughout the period of addition of said carbon dioxide gas to said slurry,

concurrently with the generation of said carbonate ions continuously grindng the solids in said slurry to convert all of said calcium hydroxide into calcium carbonate, and recovering substantially pure calcium carbonate from said slurry in the form of fine particles characterized by a surface area in the range of from about 6 to about 26 square meters per gram and being free of any traces of calcium hydroxide.

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## 3,920,801
## METHOD OF PRODUCING CHLORINE DIOXIDE FROM HYDROGEN CHLORIDE

**Morris P. Grotheer, Lewiston, N.Y., assignor to Hooker Chemicals & Plastics Corporation, Niagara Falls, N.Y.**

**Filed Apr. 5, 1974, Ser. No. 458,364**
**Int. Cl.[2] G01B** *11/02*
**U.S. Cl. 423—477** **6 Claims**

1. A continuous process for the production of chlorine dioxide which comprises the steps of

a. electrolyzing an aqueous solution of alkali metal salts containing a major amount of alkali metal chlorides to form

i. a solution containing alkali metal hydroxides,

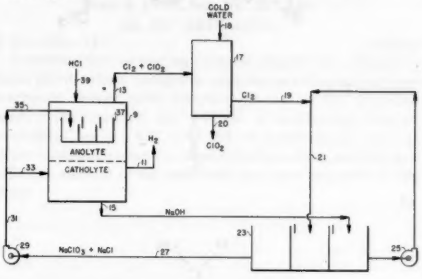
ii. gaseous chlorine,

iii. gaseous hydrogen,

b. reacting said chlorine and said solution containing alkali metal hydroxides to form a solution containing alkali metal hypochlorites,

c. adjusting the pH of said solution containing alkali metal hypochlorites to between 6–8 to convert said solution containing alkali metal hypochlorites to a solution containing alkali metal chlorates and alkali metal chlorides,

d. recycling a first portion of said solution from step (c) to step (a),




e. reacting a second portion of said solution from step (c) with hydrogen chloride to form chlorine dioxide, chlorine and a solution of alkali metal salts,

f. recycling said solution of alkali metal salts from step (e) to step (a),

g. separating the chlorine dioxide and chlorine from step (e) to recover chlorine dioxide.

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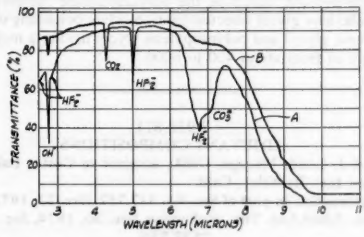
## 3,920,802
## PROCESS FOR PREPARATION OF HOT-PRESSABLE MAGNESIUM FLUORIDE

**Robert H. Moss, Cleveland Heights; Carl F. Swinehart, University Heights, and William F. Spicuzza, Eastlake, all of Ohio, assignors to Kewanee Oil Company, Bryn Mawr, Pa.**

**Filed Mar. 4, 1974, Ser. No. 447,948**
**Int. Cl.[2] C01F** *5/28*
**U.S. Cl. 423—490** **8 Claims**




1. A process for the preparation of pressable magnesium fluoride consisting essentially of deformable particles which may be physically deformed under sufficiently high heat and pressure conditions to form an optical body characterized by in excess of 90 percent transmittance of infra-red radiation over a range of wavelength up to about 10 microns, said process comprising:

a. forming a slurry of basic magnesium carbonate;

b. saturating said slurry with carbon dioxide to form at least some magnesium bicarbonate;

c. contacting said slurry with excess aqueous hydrofluoric acid to convert all magnesium compounds in said slurry to magnesium fluoride, then

d. adjusting the pH to fall in the range from about 2 to about 4;

e. recovering said magnesium fluoride formed,

f. removing moisture from said magnesium fluoride to yield magnesium fluoride powder; and

g. heat-treating recovered magnesium fluoride powder at a temperature below about 600°C to yield discrete particles of said pressable powder.

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## 3,920,803
## OXYGEN-GENERATING GRANULES

**Daniel A. Boryta, Downingtown, Pa., assignor to Foote Mineral Company, Exton, Pa.**

**Filed Oct. 20, 1972, Ser. No. 299,286**
**Int. Cl. C01b** *13/02*
**U.S. Cl. 423—579** **9 Claims**

1. Solid, oxygen-generating granules for use in closed cycle life support systems comprising a mixture of

lithium peroxide,

a peroxide decomposition catalyst selected from the group consisting of a heavy metal or compound thereof, and

a non-oxidizable, hygroscopic agent capable of forming a liquid phase in said granules upon the absorption of water vapor selected from the group consisting of cesium chloride, magnesium chloride, calcium chloride, lithium chloride, sodium hydroxide, potassium hydroxide and cesium hydroxide, said lithium peroxide being catalytically decomposed in said liquid phase with the evolution of oxygen and absorption of carbon dioxide and water vapor.

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## 3,920,804
## HYDROGEN PROCESS

**Walter H. Seitzer, West Chester, Pa., assignor to Sun Ventures, Inc., St. Davids, Pa.**

**Continuation-in-part of Ser. No. 404,963, Oct. 10, 1973, abandoned. This application Sept. 16, 1974, Ser. No. 506,495**
**Int. Cl.[2] C01B** *1/16, 2/06*
**U.S. Cl. 423—650** **4 Claims**

1. A two step process for producing hydrogen which consists of a first step of making a wet gas consisting mainly of a mixture of hydrogen and CO by reacting steam heated to a temperature of at least 3,600°F. and not exceeding 4,500°F. in the absence of added oxygen with a hydrocarbon selected from the group of heavy gas oil, residuum oil and crude oil, a second step of shifting the CO in the product stream of said first step to $CO_2$ and hydrogen, and separating $CO_2$ to yield a hydrogen product stream.

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## 3,920,805
## PHARMACEUTICAL DEVICES AND METHOD

**Theodore J. Roseman, Portage, Mich., assignor to The Upjohn Company, Kalamazoo, Mich.**

**Continuation of Ser. No. 206,437, Dec. 9, 1971, abandoned. This application Dec. 17, 1973, Ser. No. 425,600**
**Int. Cl.[2] A61K** *27/12*
**U.S. Cl. 424—15** **2 Claims**

1. A solid pharmaceutical device formed as a vaginal ring of a nontoxic resilient medication diffusing organopolysiloxane polymer and an effective vaginal dosage amount of a medication diffusible therein which releases said medication during residence in the vaginal cavity of a living mammal consisting essentially of, in combination, a nonmedicated central core of said polymer and an encircling finite thickness of a medicated coating of said polymer.

3,920,806
**GROWTH PROMOTING SUBCUTANEOUS COMPOSITIONS**

**Robert J. Nessel, Edison, and Jack Blodinger, Westfield, both of N.J., assignors to Merck & Co., Inc., Rahway, N.J.**

**Filed May 4, 1973, Ser. No. 357,287**
**Int. Cl.[2] A61K 9/24; A01N 17/00**
**U.S. Cl. 424—22** **5 Claims**

1. A method of accelerating growth in animals which comprises subcutaneously applying a formulation comprising a polymeric vehicle selected from the group consisting of polyethylene, polypropylene and polystyrene and a therapeutically effective amount of an active agent, 19-nor-20-spirox-4-ene-3-one, wherein the vehicle constitutes from about 50 to 95 percent and the active agent constitutes from about 5 to 50 percent of the total formulation weight.

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3,920,807
**ANTIPERSPIRANT AND DEODORANT COMPOSITIONS**

**Kenneth Vasey Curry, Camberley, and Ahamado Ismail Sahir, Isleworth, both of England, assignors to Lever Brothers Company, New York, N.Y.**

**Continuation of Ser. Nos. 393,097, Aug. 29, 1973, abandoned, and Ser. No. 169,100, Aug. 4, 1971, abandoned. This application Jan. 22, 1975, Ser. No. 543,403**
**Claims priority, application United Kingdom, Aug. 18, 1970, 70/39690; Oct. 22, 1970, 70/50187**
**Int. Cl.[2] A61K 9/14, 7/00**
**U.S. Cl. 424—46** **1 Claim**

1. In an aerosol antiperspirant composition comprising from about 0.2 to 10 weight percent of a finely divided astringent salt selected from the group consisting of zinc, aluminum, iron and zirconium, from about 0.01 to about 2.0 weight percent of a bulking agent having a bulk density of lower than about 200 kilos per cubic meter and an aerosol propellant wherein the improvement comprises making the composition substantially non-staining to clothing by incorporating from about 1.0 to 7.0 weight percent of hexylene glycol into the composition.

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3,920,808
**METHOD OF PROTECTING HUMAN SKIN FROM ACTINIC RADIATION**

**Ramon M. Fusaro, Omaha, Nebr., assignor to Regents of the University of Minnesota, Minneapolis, Minn.**

**Filed May 8, 1973, Ser. No. 358,384**
**Int. Cl.[2] A61L 23/00**
**U.S. Cl. 424—59** **6 Claims**

1. A method of protecting human skin from actinic radiation comprising applying to the skin prior to exposure to actinic radiation separate applications of effective actinic radiation shielding amounts of (1) dihydroxyacetone and (2) lawsone, each in a suitable carrier, wherein the carrier of one of said compounds is thoroughly rubbed in before the other composition is applied.

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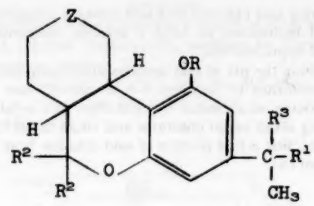
3,920,809
**DIBENZO[B,d]PYRANONE DISPERSIONS**

**Arvind L. Thakkar, Indianapolis, Ind., assignor to Eli Lilly and Company, Indianapolis, Ind.**

**Filed Nov. 5, 1973, Ser. No. 413,012**
**Int. Cl.[2] A61K 31/79**
**U.S. Cl. 424—80** **4 Claims**

1. A dispersion of 2–20 parts of polyvinylpyrrolidone having a molecular weight in the range 10,000–360,000 with one part of a compound of the formula



wherein Z is

or

wherein each R is individually hydrogen or $C_1$–$C_3$ alkanoyl, wherein $R^3$ is hydrogen or methyl, wherein each $R^2$ is either hydrogen or methyl, and both $R^2$ groups are the same, and wherein $R^1$ is $C_1$–$C_6$ alkyl.

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3,920,810
**POLYACRYLAMIDE CONTAINING OPHTHALMIC SOLUTIONS**

**Billy F. Rankin, Rockville, Md., assignor to Burton, Parsons and Company, Inc., Washington, D.C.**

**Filed Apr. 23, 1974, Ser. No. 463,273**
**Int. Cl.[2] A61K 31/79, 31/78**
**U.S. Cl. 424—80** **18 Claims**

1. An ophthalmic solution comprising an aqueous solution of a water soluble polyacrylamide polymer, having a molecular weight of at least about 75,000, in an amount of from about 0.05 to 20 weight percent sufficient to provide a viscosity of from about 0 to 30,000 cps and from about 100 to about 5000 weight percent, based on the polyacrylamide polymer, of a polyalkylene glycol selected from the class consisting of polyethylene glycol and polypropylene glycol having a molecular weight of from about 400 to 6000.

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3,920,811
**ADJUVANT COMPOSITIONS**

**Lloyd J. Lund, Moraga, Calif., assignor to Cutter Laboratories, Inc., Berkeley, Calif.**

**Continuation-in-part of Ser. No. 317,752, Dec. 22, 1972, Pat. No. 3,869,546. This application Dec. 30, 1974, Ser. No. 537,556**
**Claims priority, application United Kingdom, Dec. 12, 1973, 57602/73; Germany, Dec. 14, 1973, 2362121**
**Int. Cl.[2] A61K 27/12**
**U.S. Cl. 424—88** **9 Claims**

1. A sterile lyophilized powder, for reconstitution as an adjuvant for antigens which stimulate the production of antibodies by mixture with sterile water and with such antigens to form sterile injectable aqueous adjuvant-antigen solutions, consisting essentially of a mixture of a colloidally water-soluble substantially neutral polymer of acrylic acid cross-linked with from 0.75 to 2.00% of polyallylsucrose or polyallylpentaerythritol, and an amount of a physiologically acceptable electrolyte effective to lower substantially the viscosity imparted by the polymer to aqueous solutions of the adjuvant to a maximum of about 2,000 cps. for a 0.2% solution and a maximum of about 50,000 cps. for a 3% solution thereof.

3,920,812

## METHOD FOR CONTROLLING TOBACCO MOSAIC VIRUS DISEASE

Elton W. Mann, Portales, N. Mex., assignor to Research Corporation, New York, N.Y.

Division of Ser. No. 121,199, March 4, 1971, Pat. No. 3,819,829, which is a division of Ser. No. 672,462, Oct. 3, 1967, Pat. No. 3,617,448, which is a continuation-in-part of Ser. No. 334,907, Dec. 31, 1963, abandoned. This application June 4, 1973, Ser. No. 367,749

Int. Cl.[2] A61K *35/00*

U.S. Cl. 424—115 1 Claim

1. A method for controlling tobacco mosaic virus disease in tobacco plants which comprises applying to tobacco plants an anti-tobacco mosaic virus effective amount of the antibiotic substance prepared by the process of cultivating *Bacillus uniflagellatus*, sp. n. (ATCC 15134) in sterile liquid nutrient medium containing sources of assimilable carbon and nitrogen a sufficient amount of the antibiotic has been imparted to the medium.

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3,920,813

## METHOD OF TREATING BENIGN PROSTATIC HYPERTROPHY WITH AUREOFACIN

Harry W. Gordon, Bronx, N.Y., assignor to Schmid Laboratories, Inc., Little Falls, N.J.

Division of Ser. No. 313,568, Dec. 8, 1972, which is a division of Ser. No. 194,052, Oct. 29, 1971, which is a division of Ser. No. 70,509, Sept. 8, 1970, which is a continuation-in-part of Ser. No. 544,712, April 25, 1966, abandoned, and a continuation of Ser. No. 623,847, March 17, 1967, Pat. No. 3,584,118. This application Nov. 12, 1973, Ser. No. 414,968

Int. Cl.[2] A61K *35/00*

U.S. Cl. 424—115 4 Claims

1. A method for the treatment of benign prostatic hypertrophy in a large mammal afflicted with prostatic hypertrophy which comprises orally administering to said mammal an effective dose for treating prostatic hypertrophy of aureofacin.

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3,920,814

## ANTIBIOTIC COMPOSITION CONTAINING AN ANTIBIOTIC AND AS A POTENTIATING AGENT PYRROLIDONE CARBOXYLIC ACID OR DERIVATIVE THEREOF

Dominique Bocher, 11, rue du Moulin Vert, Paris 14°, and Charles Pilet, 8, avenue du Buisson, (94) Parc-Saint-Maur, both of France

Filed Aug. 13, 1973, Ser. No. 387,611

Claims priority, application Luxembourg, Aug. 18, 1972, 65921

Int. Cl.[2] A61K *35/00*

U.S. Cl. 424—115 7 Claims

1. An antibiotic composition comprising gentamycin and pyrrolidone carboxylic acid, wherein the weight ratio of pyrrolidone carboxylic acid to gentamycin ranges between 1:5–100.

3,920,815

## TASTE-MODIFYING COMPOSITION

Robert Joseph Harvey, and John Richard Fennell, both of Sudbury, Mass., assignors to Mirlin Corporation, Hudson, Mass.

Continuation-in-part of Ser. Nos. 28,981, April 15, 1970, Pat. No. 3,676,149, and Ser. No. 130,481, April 1, 1971, abandoned, Division of Ser. No. 269,972, July 10, 1972, Pat. No. 3,824,323. This application Aug. 30, 1973, Ser. No. 392,942The portion of the term of this patent subsequent to July 11, 1989, has been disclaimed.

Int. Cl.[2] A61K *35/78*

U.S. Cl. 424—175 5 Claims

1. In a composition for suppressing sour taste and enhancing sweet and salt taste, said composition retaining its taste-modifying characteristics at normal room temperatures for long periods of time and comprising particulate-solid material rich in the taste-modifying principle of the ripe fruit of *Synsepalum dulcificum* Daniell, said composition being obtained from said ripe fruit by the process including comminuting said ripe fruit to rupture the cellular structure thereof, and separating the vaporous, liquid and enzymatic components of the ripe fruit that degrade the taste-modifying principle from the portions of the ripe fruit rich in the taste-modifying principle, whereby said composition is substantially free of the active components of the ripe fruit that otherwise degrade the taste-modifying principle, that improvement wherein said composition contains less than about 25 wt.% carbohydrates of the ripe fruit and said process is characterized by removing not less than 75 wt.% of the carbohydrates of said ripe fruit from said comminuted ripe fruit and discarding said not less than 75 wt.%.

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3,920,816

## COMPOSITION FOR TREATING RESPIRATORY DISEASES

Manfred I. L. Seegall, and Vera A. Seegall, both of San Diego, Calif., assignors to Vis Mediatrix Naturae Scientific Laboratories, San Diego, Calif.

Continuation-in-part of Ser. No. 694,394, Dec. 29, 1967, abandoned, which is a continuation-in-part of Ser. No. 510,396, Nov. 29, 1965, abandoned, which is a continuation-n-part of Ser. No. 690,450, Oct. 16, 1957, abandoned. This application Oct. 21, 1970, Ser. No. 82,811

Int. Cl.[2] A61K *35/78*

U.S. Cl. 424—195 4 Claims

1. A composition exhibiting an expectorant property, with the ability to cleanse the bronchial tree, and a tonic property by strengthening and energizing, and a generally stimulant property, with a favorable effect on metabolism, all of which makes it useful in the treatment of acute and chronic bronchitis, post-influenzal cough and cigarette cough, said composition consisting of 44.4% by weight of the juice from freshly cut leaves of the plant *Aloe arborescens*, including suspended solid ingredients of this plant, obtained by extracting the leaves in boiling bees-honey, in quantity of 55.6% by weight.

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3,920,817

## COMPOSITION FOR TREATMENT OF ARTHRITIS

Wagn Ole Godtfredsen, Vaerlose, Denmark, assignor to Leo Pharmaceutical Products Ltd., Ballerup, Denmark

Filed Sept. 9, 1974, Ser. No. 504,247

Claims priority, application United Kingdom, Sept. 13, 1973, 43156/73

Int. Cl.[2] A61K *31/56*

U.S. Cl. 424—242 14 Claims

1. A method of treating acute or chronic arthritis which comprises administering to a host in need of such treatment, an effective amount of a member of the group consisting of fusidic acid, 24,25-dihydrofusidic acid, 17,20–24,25-tetrahydrofusidic acid, a conjugate of fusidic acid, 24,25-dihydrofusidic acid and 17,20–24,25-tetrahydrofusidic acid with glycine and taurine, and a nontoxic, pharmaceutically acceptable salt thereof.

## 3,920,818
## 1-POLYFLUOROALKYL-1,4-BENZODIAZEPIN-2-THIONES FOR EFFECTING TRANQUILIZATION, SEDATION AND TREATING COLVULSIONS

**Martin Steinman, Livingston, N.J., assignor to Schering Corporation, Kenilworth, N.J.**

**Division of Ser. No. 275,396, July 26, 1972, Pat. No. 3,845,039, which is a continuation-in-part of Ser. No. 220,370, Jan. 24, 1972, abandoned, which is a continuation-in-part of Ser. No. 62,164, Aug. 7, 1970, abandoned. This application July 31, 1974, Ser. No. 494,002**

**Int. Cl. A61k** *31/33*

**U.S. Cl. 424—244** **3 Claims**

1. A method for effecting tranquilization comprising administering to a mammal exhibiting symptoms of anxiety 7-chloro-1-(2,2,2-trifluoroethyl)-1,3-dihydro-5-(2-fluorophenyl)-2H-1,4-benzodiazepin-2-thione or a pharmaceutically acceptable salt thereof in an amount sufficient to effect tranquilization.

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## 3,920,819
## NONAQUEOUS VEHICLE FOR ORAL PHARMACEUTICAL SUSPENSIONS

**Verlin C. Stephens, and Kenneth S. E. Su, both of Indianapolis, Ind., assignors to Eli Lilly and Company, Indianapolis, Ind.**

**Filed Dec. 2, 1974, Ser. No. 528,608**

**Int. Cl.[2] A61K** *31/545, 31/65, 31/71, 47/00*

**U.S. Cl. 424—246** **10 Claims**

1. A nonaqueous vehicle for use in an oral pharmaceutical suspension comprised of: (a) refined fractionated coconut oil having a saponification value not less than 335 and not more than 360, (b) hydrogenated castor oil having an iodine number below 6, (c) lecithin refined grade, (d) aluminum stearate, and (e) an oil insoluble excipient or combination of excipients selected from the group consisting of dextrose, fructose, glucose, maltose, mannitol and sucrose.

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## 3,920,820
## BENZOCYCLOHEPTAISOQUINOLINE DERIVATIVES III

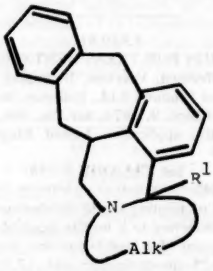
**Francois T. Bruderlein, Montreal, and Leslie G. Humber, Dollard des Ormeaux, both of Canada, assignors to Ayerst, McKenna and Harrison Ltd., Montreal, Canada**

**Division of Ser. No. 242,939, April 20, 1972, Pat. No. 3,852,452, which is a continuation-in-part of Ser. Nos. 97,481, Dec. 21, 1970, and Ser. No. 10,306, Feb. 10, 1970, Pat. No. 3,657,250. This application Feb. 19, 1974, Ser. No. 443,880**

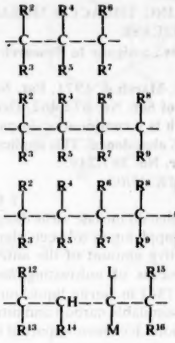
**Int. Cl.[2] A61K** *31/47*

**U.S. Cl. 424—258** **4 Claims**

1. A pharmaceutical composition having central nervous system activity containing a carrier and an amount up to about 500 milligrams effective to produce a central nervous system depressant effect in a mammal without deleterious side-effects of a compound selected from those of the formula:




in which $R^1$ is selected from the group which consists of hydrogen and lower alkyl, and Alk represents an organic radical selected from the group which consists of




, or

designated A, B, C or D respectively, in which $R^2$, $R^3$, $R^4$, $R^5$, $R^6$, $R^7$, $R^8$, $R^9$, $R^{10}$, $R^{11}$, $R^{12}$, $R^{13}$, $R^{14}$, $R^{15}$, and $R^{16}$ are each the same or different radicals selected from the group which consists of hydrogen and lower alkyl, with the proviso that the carbon atoms to which $R^2$ and $R^3$, or $R^{12}$ and $R^{13}$ are attached is bonded to the nitrogen atom of said compound; L represents hydroxyl or lower alkanoyloxy; and M is selected from the group which consists of hydrogen, lower alkyl, lower alkenyl, lower alkynyl, and cycloalkyl containing from three to size carbon atoms which may be optionally substituted by lower alkyl or phenyl; and their acid addition salts with pharmaceutically acceptable acids.

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## 3,920,821
## PHARMACEUTICAL COMPOSITIONS CONTAINING A (5-NITRO-2-FURYL)-SUBSTITUTED 2-HYDROXY-PYRIDINE AND METHOD OF USE

**Ludwig Schroder, Ingelheim am Rhein; Klaus Thomas, Gau-Algesheim, and Hanns Goeth, Biberach an der Riss, all of Germany, assignors to Boehringer Ingelheim GmbH, Ingelheim am Rhein, Germany**

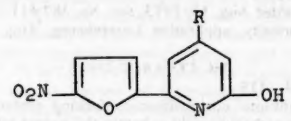
**Division of Ser. No. 290,334, Sept. 19, 1972, Pat. No. 3,829,426. This application July 1, 1974, Ser. No. 484,791**

**Claims priority, application Germany, Sept. 22, 1971, 2147288**

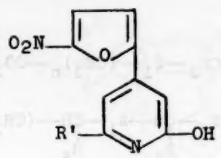
**Int. Cl.[2] A61K** *31/44*

**U.S. Cl. 424—263** **10 Claims**

1. A pharmaceutical composition for combatting pathogenic microorganisms selected from the group consisting of bacteria, fungi and protozoa, said composition consisting essentially of an inert pharmaceutical carrier and an effective antibacterial, anti-fungal or anti-protozoal amount of a compound of the formula




or



wherein

R is hydrogen, pyridyl, alkyl of 1 to 4 carbon atoms, phenyl, p-chloro-phenyl, p-(alkyl of 1 to 4 carbon atoms)-phenyl, p-nitro-phenyl or 3,5-dinitro-4-hydroxyphenyl, and

R′ is hydrogen, pyridyl or alkyl of 1 to 4 carbon atoms,

or a 2(1H)-pyridone tautomer thereof.

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## 3,920,822
## INHIBITION OF HISTAMINE ACTIVITY WITH CYANOGUANIDINES

**Graham John Durant, Welwyn Garden City; John Colin Emmett, Codicote, and Charon Robin Ganellin, Welwyn Garden City, all of England, assignors to Smith Kline & French Laboratories Limited, Welwyn Garden City, England**

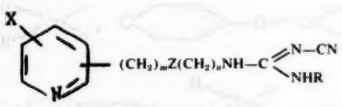
**Division of Ser. No. 384,993, Aug. 2, 1973. This application Nov. 14, 1974, Ser. No. 523,593**

**Claims priority, application United Kingdom, Sept. 5, 1972, 41160/72; Feb. 8, 1973, 6154/73**

**Int. Cl.² A61K *31/44***

**U.S. Cl. 424—263** **9 Claims**

**1.** A pharmaceutical composition to inhibit H-2 histamine receptors, said H-2 histamine receptors being those histamine receptors which are not inhibited by mepyramine but are inhibited by burimamide, comprising a pharmaceutical carrier and, in an effective amount to inhibit said receptors, a guanidine compound of the formula:



wherein R is hydrogen or lower alkyl; X is hydrogen, lower alkyl, trifluoromethyl, hydroxyl, halogen or amino; Z is sulphur or oxygen; *m* is 0, 1 or 2 and *n* is 2 or 3, the sum of *m* and *n* being 3 or 4, or a pharmaceutically acceptable acid addition salt thereof.

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## 3,920,823
## USE OF UNSYMMETRICAL ESTERS OF N-SUBSTITUTED 1,4-DIHYDROPYRIDINE 3,5-DICARBOXYLIC ACID AS CARDIO-VASCULAR AGENTS

**Horst Meyer; Friedrich Bossert, both of Wuppertal-Elberfeld; Wulf Vater, Opladen, and Kurt Stoepel, Wuppertal-Vohwinkel, all of Germany, assignors to Bayer Aktiengesellschaft, Germany**

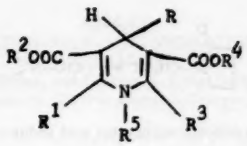
**Division of Ser. No. 336,605, Feb. 28, 1973, Pat. No. 3,883,540. This application May 30, 1974, Ser. No. 474,407**

**Claims priority, application Germany, Mar. 6, 1972, 2210672**

**Int. Cl.² A61K *31/455, 31/655***

**U.S. Cl. 424—266** **50 Claims**

**1.** The method of effecting coronary vessel dilation and a reduction in blood pressure in an animal in need thereof, which comprises administering thereto an effective amount of a compound of the general formula:



in which

R is mono-, di- or trisubstituted phenyl, in which the substituents are selected from the group consisting of nitro, cyano, azido and $S(O)_n$-lower alkyl, wherein $n = 0$, 1 or 2, lower alkyl, lower alkoxy and halogeno, the total number of said substituents being not more than 3 and at least one of said substituents being nitro, cyano, azido or $S(O)_n$-lower alkyl,

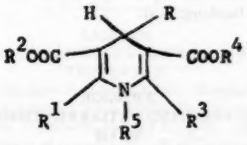
$R^1$ and $R^3$, independent of the other, is hydrogen or lower alkyl;

$R^2$ and $R^4$ are different from one another and are lower alkyl, lower alkenyl, lower alkynyl, lower alkoxy(lower alkyl) or lower cycloalkyl, unsubstituted or substituted by hydroxy;

$R^5$ is lower alkyl or benzyl,

or a pharmaceutically acceptable acid addition salt thereof.

**26.** A pharmaceutical composition for use in effecting coronary vessel dilation and a reduction in blood pressure, which comprises an effective amount of a compound of the general formula:



in which

R is mono-, di- or trisubstituted phenyl, in which the substituents are selected from the group consisting of nitro, cyano, azido and $S(O)_n$-lower alkyl, wherein $n = 0$, 1 or 2, lower alkyl, lower alkoxy and halogeno, the total number of said substituents being not more than 3 and at least one of said substituents being nitro, cyano, azido or $S(O)_n$-lower alkyl,

$R^1$ and $R^3$, independent of the other, is hydrogen or lower alkyl;

$R^2$ and $R^4$ are different from one another and are lower alkyl, lower alkenyl, lower alkynyl, lower alkoxy(lower alkyl) or lower cycloalkyl, unsubstituted or substituted by hydroxy;

$R^5$ is lower alkyl or benzyl, or a pharmaceutically acceptable acid addition salt thereof and a pharmaceutical carrier.

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## 3,920,824
## STABLE OPHTHALMIC FORMULATION

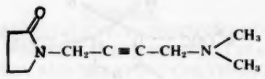
**Vithal Jagannath Rajadhyaksha, Mission Viejo, Calif., assignor to Nelson Research & Development Co., Irvine, Calif.**

**Filed Aug. 1, 1974, Ser. No. 493,751**

**Int. Cl.² A61K *31/40***

**U.S. Cl. 424—274** **2 Claims**

**1.** A method for temporarily alleviating the symptoms of glaucoma in humans comprising topically administering to the eye of a human having glaucoma an effective amount of a compound having the structural formula



or a pharmaceutically acceptable acid addition salt thereof.

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3,920,825

## PROCESSES FOR PRODUCING CONCENTRATED AQUEOUS SOLUTIONS OF FLUOBORIC ACID

**Wilfried Becher, Ilten, and Joachim Massonne, Hannover, both of Germany, assignors to Kali-Chemie Aktiengesellschaft, Hannover, Germany**

**Filed Aug. 7, 1973, Ser. No. 386,471**

**Claims priority, application Germany, Aug. 8, 1972, 2239131**

**Int. Cl.[2] C01B *35/06***

**U.S. Cl. 423—276** **8 Claims**

1. A process for the production of a concentrated aqueous solution of fluoboric acid that is essentially free of hydrogen chloride which comprises dissolving a boron compound of the group consisting of orthoboric acid, metaboric acid and boron trioxide in an aqueous solution of fluoboric acid containing at least 50% by weight of fluoboric acid and passing through the said solution a gas containing hydrogen fluoride and hydrogen chloride at such a rate that the hydrogen fluoride in the gas is selectively absorbed and reacts with the dissolved boron compound therein to form an additional quantity of fluoboric acid and thereby produce a more concentrated fluoboric acid solution or an additional quantity of a solution containing 62% by weight of fluoboric acid.

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3,920,826

## METHOD OF TREATING ANTIARRHYTHMIC ACTIVITY WITH BIS[2-(DIALKYLAMINO)ETHOXY]XANTHEN-9-ONE ANTIARRHYTHMIC AGENTS

**Thomas Baum, Broomall, Pa., assignor to American Home Products Corporation, New York, N.Y.**

**Filed July 1, 1974, Ser. No. 484,501**

**Int. Cl.[2] A61K *31/35***

**U.S. Cl. 424—283** **4 Claims**

1. A method of treating arrhythmic activity in warm blooded animals comprising administering to a host suffering from arrhythmic activity an antiarrhythmic effective amount of a compound selected from the class consisting of 1,6-bis[2-(diethylamino)ethoxy]xanthen-9-one; 2,6-bis(2-diethylaminoethoxy)xanthen-9-one; 1,6-bis[2-(diisopropylamino)ethoxy]xanthen-9-one and their pharmaceutically acceptable addition salt in a pharmaceutically acceptable carrier.

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3,920,827

## PHARMACEUTICAL COMPOSITIONS CONTAINING THERAPEUTIC 5',6'-DIHYDRO-2H-PYRAN-4'-YLOXY PROSTAGLANDINS

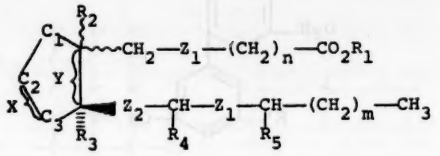
**Ned M. Weinshenker, Sunnyvale, Calif., and Niels H. Andersen, Seattle, Wash., assignors to ALZA Corporation, Palo Alto, Calif.**

**Division of Ser. No. 156,510, June 24, 1971, Pat. No. 3,853,854. This application Aug. 9, 1974, Ser. No. 496,427**

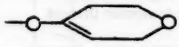
**Int. Cl.[2] A61K *31/35***

**U.S. Cl. 424—283** **2 Claims**

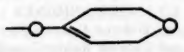
1. A pharmaceutical preparation comprising 0.01 milligrams to 1500 milligrams of a member selected from the group consisting of a compound of the formula:



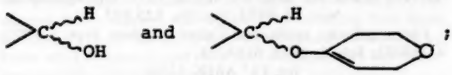
wherein $R_1$ is selected from the group consisting of hydrogen and lower alkyl; $R_2$ and $R_3$ are both hydrogen when Y is a single bond and $R_2$ and $R_3$ are both absent when Y is a double bond; $R_4$ is



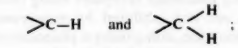
$R_5$ is a member selected from the group consisting of hydrogen and



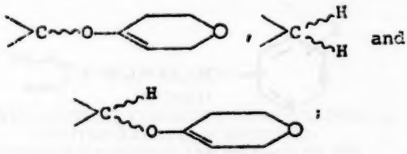
$C_1$ is a member selected from the group consisting of >C=O,



$C_2$ is a member selected from the group consisting of



$C_3$ is a member selected from the group consisting of >C—H,



$Z_1$ is a member selected from the group consisting of cis and trans —CH=CH— and $—CH_2CH_2—$; $Z_2$ is a member selected from the group consisting of trans —CH=CH— and $—CH_2CH_2—$; X is selected from the group consisting of a single bond and double bond and X is a double bond when $C_2$ and $C_3$ are substituted with hydrogen and wherein $n$ is 1 to 5 and $m$ is 0 to 5; the diasteroemers and non-toxic salts thereof admixed with a pharmaceutically acceptable carrier.

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3,920,828

## SUBSTITUTED BENZOFURANS

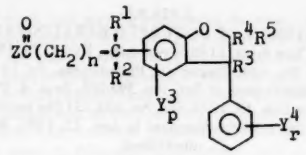
**Robert A. Scherrer, White Bear Lake, Minn., assignor to Riker Laboratories, Inc., Northridge, Calif.**

**Division of Ser. No. 199,318, Nov. 11, 1971, Pat. No. 3,862,134. This application July 31, 1974, Ser. No. 493,215**

**Int. Cl.[2] A61K *31/34***

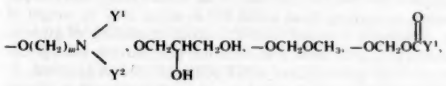
**U.S. Cl. 424—285** **17 Claims**

1. A method for combatting inflammatory processes in a mammalian animal which comprises administering to said animal an effective dose less than the toxic amount of a compound of the formula



wherein:

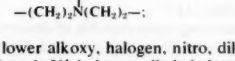
Z is hydroxyl, lower alkoxy, $-NH_2$, $-NHY^1$, $-NY^1Y^2$,



$-NHOH$ or $-NHNH_2$;

$R^1$ is hydrogen or alkyl containing not more than two carbon atoms; $R^2$ is hydrogen or, with $R^1$, forms $=CH_2$; $R^3$ and $R^4$ are hydrogen or, together, a carbon-carbon bond; $R^5$ is hydrogen or lower alkyl, provided that when $R^3$ and $R^4$ form a bond, $R^5$ may be halogen;

$Y^1$ and $Y^2$ are lower alkyl or, together, form a cyclic group selected from $-(CH_2)_4-$, $-(CH_2)_5-$, $-(CH_2)_2O(CH_2)_2-$ and



$Y^3$ is lower alkyl, lower alkoxy, halogen, nitro, diloweralkylamino or hydroxyl; $Y^4$ is lower alkyl, halogen, lower haloalkyl, lower alkoxy, lower haloalkoxy, nitro, diloweralkylamino, lower alkylthio, lower alkylsulfonyl, lower alkylsulfinyl or hydroxyl;

$m$ is 2-3; $n$ is 0-2; $p$ is 0-2 and $r$ is 0-5; or a pharmaceutically acceptable salt thereof.

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### 3,920,829
### INFLAMMATION INHIBITING BIS-CARBAMATE COMPOSITION

**Wolfgang Rohr, Mannheim; Albrecht Franke, Ludwigshafen; Hubert Giertz, Limburgerhof, and August Amann, Ludwigshafen, all of Germany, assignors to Badische Anilin- & Soda-Fabrik Aktiengesellschaft, Ludwigshafen (Rhine), Germany**

**Filed Aug. 30, 1972, Ser. No. 284,760**

**Int. Cl.[2] A61K** *31/27*

**U.S. Cl. 424—300** **2 Claims**

1. An inflammation inhibiting composition comprising an effective anti-inflammation amount of N-(2-methyl-4-benzylcarbamoyloxyphenyl)-methyl carbamate in a perorally administrable drug formulation.

### 3,920,830
### INSECTICIDAL N-[(N'-ACYLAMIDO)THIO]ARYL CARBAMATES

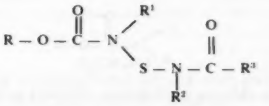
**Melacthon S. Brown, and Gustave K. Kohn, both of Berkeley, Calif., assignors to Chevron Research Company, San Francisco, Calif.**

**Division of Ser. No. 54,854, July 14, 1970, Pat. No. 3,812,174. This application Mar. 4, 1974, Ser. No. 447,799**

**Int. Cl.[2] A01N** *9/12, 9/20*

**U.S. Cl. 424—300** **20 Claims**

1. A method for killing insects which comprises contacting said insects with an insecticidally effective amount of a compound of the formula



wherein R is hydrocarbon aryl of 6 to 14 carbon atoms substituted with 0 to 4 halogen atoms of atomic number 9 to 35, nitro groups, alkoxy groups of 1 to 7 carbon atoms, alkylthio of 1 to 3 carbon atoms or 0 to 1 dialkylamino in which the alkyl groups individually contain 1 to 3 carbon atoms; $R^1$ is hydrogen or alkyl of 1 to 4 carbon atoms; $R^2$ is alkyl of 1 to 10 carbon atoms substituted with 0 to 4 halogen atoms of atomic number 17 to 35 or cycloalkyl of 3 to 10 carbon atoms substituted with 0 to 4 halogen atoms of atomic number 17 to 35; and $R^3$ is hydrogen, alkyl of 1 to 10 carbon atoms substituted with 0 to 4 halogen atoms of atomic number 17 to 35 or cycloalkyl of 3 to 10 carbon atoms substituted with 0 to 4 halogen atoms of atomic number 17 to 35.

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### 3,920,831
### FUNGICIDAL SUBSTITUTED UREIDOPHENYL THIOUREAS

**Arno Widdig, Blecher; Engelbert Kühle, Bergisch Gladbach; Klaus Sasse, Schildgen; Hans Scheinpflug, Leverkusen; Ferdinand Grewe, Burscheid; Helmut Kaspers, and Paul-Ernst Frohberger, both of Leverkusen, all of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany**

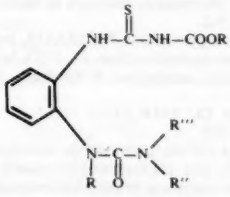
**Division of Ser. No. 89,500, Nov. 13, 1970, Pat. No. 3,780,089. This application Sept. 21, 1973, Ser. No. 399,653**

**Claims priority, application Germany, Nov. 29, 1969, 1960029**

**Int. Cl.[2] A01N** *9/12*

**U.S. Cl. 424—300** **9 Claims**

1. A fungicidal composition comprising a fungicidally effective amount of a ureidophenyl thiourea of the formula



in which

R stands for alkyl with 1-12 carbon atoms,

R' and R'' each stands independently for a hydrogen or alkyl with 1-4 carbon atoms, and

R''' stands for alkyl with 1 or 2 carbon atoms; alkyl with 1 to 12 carbon atoms substituted by alkoxy with 1 to 4 carbon atoms, cyano, dialkylamino with up to 4 carbon atoms; phenyl; benzyl; p-tolyl; p-methoxyphenyl; acetyl; benzoyl; methanesulfonyl; or p-toluenesulfonyl, and a diluent.

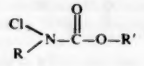
3,920,832

## N-CHLORO CARBAMATES AS INSECTICIDES AND FUNGICIDES

Sol J. Barer, 18-01 Fox Run Drive, Plainsboro, N.J. 08536; Richard F. Stockel, 475 Rolling Hills Road, Bridgewater Township, N.J. 08876, and Jaroslav Vit, 40 Partridge Run, Belle Mead, N.J. 08536

Filed Apr. 18, 1974, Ser. No. 462,113
Int. Cl.[2] A01N 9/20
U.S. Cl. 424—300 12 Claims

1. A method of destroying insects comprising applying to said insects an insecticidally effective amount of an N-chloro compound of the formula



where R is chlorine, hydrogen or alkyl of 1 to 6 carbon atoms, and wherein R′ is alkyl of 1 to 6 carbon atoms.

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3,920,833

## ANTIFIBRINOLYTIC AGENTS

Elton S. Cook; Kinji Tanaka, and Akira Fujii, all of Cincinnati, Ohio, assignors to Stanley Drug Products, Inc., Portland, Oreg.

Filed Aug. 8, 1974, Ser. No. 495,553
Int. Cl.[2] A61K 31/26
U.S. Cl. 424—303 5 Claims

1. A process for the control of hyperplasminaemia in a mammal which comprises administering to a hyperplasminic mammal a plasmin inhibiting amount effective to control hyperplasminaemia of an omega-aminoalkanesulfonic acid having the formula $H_2N-(CH_2)_n-SO_3H$ where n is a whole number less than five.

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3,920,834

## LIGHT-SCREENING COMPOSITIONS AND METHOD

Heinrich Kläui, Riehen, and Wilheim Friedrich Körner, Bettingen, both of Switzerland, assignors to Hoffmann-La Roche Inc., Nutley, N.J.

Continuation-in-part of Ser. No. 153,118, June 14, 1971, abandoned. This application Sept. 11, 1973, Ser. No. 396,278
Claims priority, application Switzerland, July 10, 1970, 10481/70
Int. Cl.[2] A61K 31/12, 31/22, 31/19
U.S. Cl. 424—305 5 Claims

1. A method for the prophylactic treatment of sun erythema, sunburn and photosensitivity caused by ultraviolet light rays which comprises orally administering to a person in need of such treatment an oral composition comprising

a. pharmaceutically acceptable carriers and excipients or mixtures thereof, and

b. from about 5 mg. to about 50 mg. of a mixture containing from about 50% to 75% by weight of canthaxanthin and from about 25% to 50% by weight of a carotenoid selected from the group consisting of β-carotene, β-apo-8′-carotenal, β-apo-8′-carotenoic acid ethyl ester, bixin, zeaxanthin, crocetin and citranaxanthin, for a period of from about 10 to about 20 days prior to expected exposure to sunlight.

3,920,835

## TREATMENT OF DISTURBED KERATINIZATION

Eugene J. Van Scott, 1138 Sewell Lane, Rydal, Pa. 19046, and Ruey J. Yu, 4400 Dexter St., Philadelphia, Pa. 19128

Continuation-in-part of Ser. No. 394,269, Sept. 4, 1973. This application Feb. 25, 1974, Ser. No. 445,231The portion of the term of this patent subsequent to Apr. 22, 1992, has been disclaimed.
Int. Cl.[2] A61K 31/22, 31/19
U.S. Cl. 424—311 5 Claims

1. A method of alleviating the symptoms of acne comprising topically applying an effective amount of a medicinal composition to the involved portions of the human body, said composition comprising from about 1% to about 20% by weight of a compound selected from the group consisting of glycolic acid, citric acid, malic acid, tartronic acid, tartaric acid, glycuronic acid, pyruvic acid, ethyl pyruvate, methyl pyruvate, 2-hydroxyisobutyric acid, and 3-hydroxy butyric acid in admixture with a pharmaceutically acceptable carrier.

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3,920,836

## SANITIZING PLASTIC MATERIAL

Robert H. McIntosh, and Ezekiel H. Hull, both of Greensboro, N.C., assignors to Anthony B. Askew, Atlanta, Ga.

Continuation of Ser. No. 292,792, Sept. 27, 1972, abandoned, which is a division of Ser. No. 139,265, April 30, 1971, Pat. No. 3,705,235. This application Dec. 21, 1973, Ser. No. 427,382
Int. Cl.[2] A61L 13/00
U.S. Cl. 424—315 7 Claims

1. A sanitizing agent capable of destroying or inhibiting the growth of both Gram negative and Gram positive bacteria, fungi and Pseudomonas aeruginosa, said agent consisting essentially of a mixture of a nonionic trialkylamine and a compound selected from the group consisting of a Group II-A or Group II-B metal salt of a monocarboxylic acid having a carbon chain length of 1 to 4.

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3,920,837

## METHOD OF TREATMENT OF CALCIUM DISORDERS USING CYCLOHEXANE-HEXACARBOXYLIC ACID

Manfred Schmidt-Dunker, Dusseldorf; Walter Plöger, Hilden Rhld.; Karl-Heinz Worms; Helmut Blum, both of Dusseldorf, and Christian Gloxhuber, Haan Rhld., all of Germany, assignors to Henkel & Cie GmbH, Dusseldorf-Holthausen, Germany

Filed Aug. 20, 1974, Ser. No. 498,999
Claims priority, application Germany, Aug. 27, 1973, 2343197
Int. Cl.[2] A61K 31/19
U.S. Cl. 424—317 3 Claims

1. A method for alleviating conditions caused by the abnormal deposition or dissolution of difficultly soluble calcium salts in the body of warm-blooded animals having said conditions which consists of administering orally or parenterally to said warm-blooded animals, from 0.05 to 500 mg/kg of the animal body weight of at least one pharmacologically acceptable cyclohexane-hexacarboxylic acid derivative selected from the group consisting of cyclohexane-1,2,3,4,5,6-hexacarboxylic acid and water-soluble salts thereof.

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3,920,838

## AMINO ACID THERAPY

Jean-Pierre Flatt, Box 53, Princeton, Mass. 01541, and George L. Blackburn, 100 Memorial Drive, Cambridge, Mass. 02142

Filed Sept. 4, 1973, Ser. No. 393,710
Int. Cl.[2] A61K 31/195, 37/18
U.S. Cl. 424—319 9 Claims

1. A method of treatment of patients suffering trauma, sepsis, infection, injury or other diseases during periods of severe negative caloric balance due to disuse of the gastro-

intestinal tract, said method comprising the steps of developing and maintaining a metabolic state simulating caloric starvation by substantially withholding exogeneous carbohydrates from the patient while parenterally administering amino acid solutions to said patients while maintaining a negative caloric balance, said parenteral administration of amino acid solution continuing at least until said patient begins to use the gastrointestinal tract to take oral nourishment, said amino acid solution containing amino acids in an amount sufficient to replenish depleted amino acid pools in said patient.

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## 3,920,839
## ADAMANTYLCARBOXAMIDOPHENYLALKANOIC ACIDS AND ESTERS THEREOF FOR TREATING INFLAMMATORY DISORDERS AND ALLERGIES

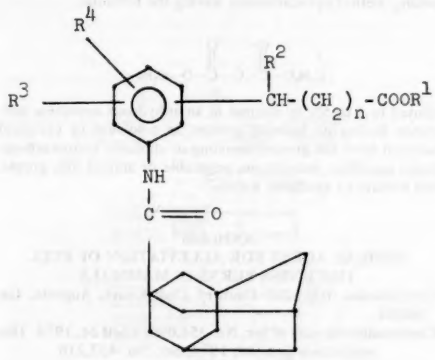
**Jan W. F. Wasley, Mount Kisco, N.Y., assignor to Ciba-Geigy Corporation, Ardsley, N.Y.**

**Continuation-in-part of Ser. No. 311,054, Dec. 1, 1972, Pat. No. 3,839,433, which is a continuation-in-part of Ser. No. 157,770, June 28, 1971, abandoned, which is a continuation-in-part of Ser. No. 22,406, March 24, 1970, abandoned, which is a continuation-in-part of Ser. No. 810,828, March 26, 1969, abandoned. This application Apr. 12, 1974, Ser. No. 460,406**

**Int. Cl. A61k** *31/195, 31/24*

**U.S. Cl. 424—319** **10 Claims**

1. An antiallergic pharmaceutical composition comprising an antiallergically effective amount of a compound of the formula



wherein $R^1$ is hydrogen or lower alkyl, $R^2$ is hydrogen or lower alkyl, $R^3$ and $R^4$ are hydrogen, fluorine, chlorine, bromine, lower alkyl, lower alkoxy or trifluoromethyl, and $n$ is 0 or 1, or an alkali metal or ammonium salt thereof, together with a pharmaceutical excipient.

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## 3,920,840
## TREATMENT OF PSORIASIS WITH N-METHYLDIETHANOLAMINE

**Eugene J. Van Scott, 1138 Sewell Lane, Rydal, Pa. 19046, and Ruey J. Yu, 4400 Dexter St., Philadelphia, Pa. 19128**

**Continuation-in-part of Ser. No. 371,516, June 19, 1973. This application Mar. 28, 1974, Ser. No. 455,665**

**Int. Cl.² A61K** *31/13*

**U.S. Cl. 424—325** **17 Claims**

1. A composition for the topical treatment of psoriasis comprising:

0.5 to 5.0 percent by weight of N-Methyldiethanolamine in admixture with a mixture of water, ethanol, and propylene glycol in a volume ratio of 40:40:20.

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## 3,920,841
## METHODS OF COMBATTING FUNGI AND BACTERIA USING α-CHLORO-α-ISONITROSOACETOPHENONE

**Jacques Perronnet, and Pierre Girault, both of Paris, France, assignors to Roussel UCLAF, Paris, France**

**Filed June 29, 1973, Ser. No. 375,103**

**Claims priority, application France, July 13, 1972, 72.25494**

**Int. Cl.² A01N** *9/20, 9/24*

**U.S. Cl. 424—327** **2 Claims**

1. A method of combatting bacteria and fungi comprising contacting bacteria or fungi with a bactericidal or fungicidal amount of ω-chloro-ω-isonitroso-acetophenone.

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## 3,920,842
## METHODS OF COMBATTING FUNGI AND BACTERIA USING SUBSTITUTED-ALPHA ISONITROSI-ACETOPHENONES

**Jacques Perronnet, and Pierre Girault, both of Paris, France, assignors to Roussel Uclaf, Paris, France**

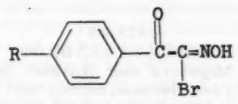
**Filed Dec. 10, 1973, Ser. No. 423,211**

**Claims priority, application France, Dec. 27, 1972, 72.46323**

**Int. Cl.² A01N** *9/20, 9/24*

**U.S. Cl. 424—327** **4 Claims**

1. A method of combatting bacteria and fungi comprising contacting bacteria and fungi with a lethal amount of a bactericidal and fungicidal compound of the formula



wherein R is selected from the group consisting of hydrogen, hydroxy and methyl.

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## 3,920,843
## TOPICAL FUNGICIDAL COMPOSITION FOR DERMATOMYCOSIS OF ANIMALS

**Noritoshi Kitano; Shinichi Sugawara; Yukichi Kishida; Fusao Kondo; Yukio Sugimura, and Nobuo Soma, all of Tokyo, Japan, assignors to Sankyo Company Limited, Tokyo, Japan**

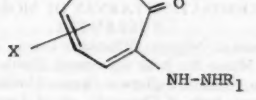
**Filed Jan. 7, 1974, Ser. No. 431,030**

**Claims priority, application Japan, Jan. 27, 1973, 48-11506**

**Int. Cl. A61l** *9/04*; **A61k** *31/15*

**U.S. Cl. 424—45** **8 Claims**

1. A topical fungicidal composition which comprises, as an active component in an amount sufficient to inhibit dermatomycosis of an animal, a 2-hydrazinotropone having the formula



(I)

or a dermatologically acceptable acid addition salt thereof, wherein $R_1$ represents alkyl having from one to 4 carbon atoms or phenyl which may be substituted with halogen, alkyl having from one to four carbon atoms, nitro or alkoxy from one to four carbon atoms, X represents hydrogen atom or an alkyl group having from one to four carbon atoms together with benzyl alcohol.

**3,920,844**

## CHLORINATED DIAROMATIC-SUBSTITUTED AMINOALKANES AS FUNGICIDES AND INSECTICIDES

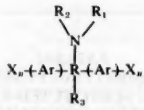
**Sol J. Barer, Plainsborough, and Peter C. Valenti, East Windsor, both of N.J., assignors to National Patent Development Corporation, New York, N.Y.**

**Filed June 10, 1974, Ser. No. 477,961**

**Int. Cl.[2] A01N** *9/20, 9/24*

**U.S. Cl. 424—330** **18 Claims**

1. A method of destroying pests selected from the group consisting of fungi and insects comprising applying to said pest a biocidally effective amount of an N-halo compound of the formula:



where R is an aliphatic hydrocarbon group of 1 to 20 carbon atoms, Ar is a mono or polyaromatic hydrocarbon ring, $R_1$ is chlorine or bromine, $R_2$ is hydrogen, chlorine, bromine or alkyl, $R_3$ is hydrogen, alkyl or haloalkyl, X is halogen, and *n* is an integer of 0 to 3.

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**3,920,845**

## 2-NITROINDAN-1,3-DIONE

**Harry Smith, Maplehurst near Horsham; Derek Richard Buckle, Roffey near Horsham; Barbara Anne Spicer, Guildford, and Esther Beatrice Wade, South Croydon, all of England, assignors to Beecham Group Limited, United Kingdom**

**Continuation-in-part of Ser. No. 277,625, Aug. 3, 1972, abandoned. This application Aug. 28, 1974, Ser. No. 501,139**

**Claims priority, application United Kingdom, Aug. 3, 1971, 36379/71**

**Int. Cl.[2] A61K** *31/12*

**U.S. Cl. 424—331** **16 Claims**

1. A pharmaceutical composition for the prophylaxis or treatment of asthmatic symptoms and hay fever comprising an effective amount 2-nitroindan-1,3-dione or a pharmaceutically acceptable non-toxic salt thereof as the active ingredient, in combination with a pharmaceutically acceptable carrier.

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**3,920,846**

## NOVEL INSECTICIDES AND METHOD FOR EXTERMINATING LARVAE OF MOSQUITOES THEREWITH

**Kunio Hanauye, Nagoya; Mitsuhiro Iwasa, Tokai; Tsutomu Takase; Mizuo Ito, both of Nagoya; Yoshio Sato, Koganei; Teruhiko Toyama, Fujisawa; Osamu Morikawa, and Takamitsu Imai, both of Chigasaki, all of Japan, assignors to Mitsui Toatsu Chemicals, Incorporated, Tokyo, Japan**

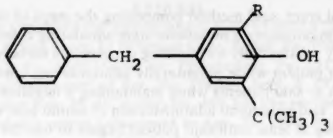
**Filed May 28, 1974, Ser. No. 473,573**

**Claims priority, application Japan, May 28, 1973, 48-58558**

**Int. Cl.[2] A01N** *9/00, 9/26*

**U.S. Cl. 424—346** **5 Claims**

1. A method for exterminating larvae of mosquitoes which comprises applying to said larvae an insecticidally effective amount of a compound of the general formula



wherein R is hydrogen or t-butyl, with the proviso that the hydroxyl group is in the ortho position with respect to R and at least one t-butyl group is present in the ortho position with respect to the hydroxyl group.

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**3,920,847**

## COMPOSITION FOR MEDICAL, VETERINARY OF COSMETOLOGICAL USE CONTAINING A DIETHYL PYROCARBONATE

**Rene Bernard Albert Chalaust, 22, rue de Saint Germain, Port Marly, Yvelines, France**

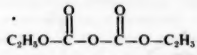
**Filed Feb. 13, 1973, Ser. No. 332,171**

**Claims priority, application France, Feb. 17, 1972, 72.005365**

**Int. Cl.[2] A61K** *31/265*

**U.S. Cl. 424—301** **5 Claims**

3. A method for topical administration in human and veterinary medicine for treating mastitis and facilitating cicatrization, said method comprising administering to an animal or human an effective, non-toxic amount of a composition comprising diethyl pyrocarbonate having the formula:



diluted to 1 to 5% by volume in an anhydrous aprotonic substance having no hydroxy groups, in a solvent or excipient selected from the group consisting of aliphatic hydrocarbons, liquid paraffins, petrolatum, vegetable or animal oils, grease, and natural or synthetic waxes.

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**3,920,848**

## TOPICAL AGENT FOR ALLEVIATION OF FULL THICKNESS BURNS IN MAMMALS

**Carl Jelenko, III, 2205 Country Club Court, Augusta, Ga. 30904**

**Continuation-in-part of Ser. No. 354,099, April 24, 1973. This application Jan. 10, 1974, Ser. No. 432,216**

**Int. Cl.[2] A61K** *27/00*

**U.S. Cl. 424—312** **5 Claims**

1. A method of treating full thickness burns on a mammal which comprises topically applying to said burns an effective burn-healing amount of ethyl-cis, cis (9,12)-octadecadienoate.

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**3,920,849**

## CHEWING GUM CONTAINING FLAVOR COMPOSITION

**Don Marmo, Farmingdale, and Frank Louis Rocco, Richmond Hill, both of, NY, assignors to International Flavors & Fragrances Inc., New York, N.Y.**

**Filed Oct. 15, 1974, Ser. No. 514,947**

**Int. Cl.[2] A23G** *3/30;* **A23L** *1/222*

**U.S. Cl. 426—3** **6 Claims**

1. A chewing gum comprising particles of a composition consisting essentially of:

a. From about 3 up to about 7 parts by weight of a non-confined hydropobic flavor oil;

b. From about 3 up to about 7 parts by weight of a hydrolytically releaseable flavor oil physically entrapped in an edible solid material selected from the group consisting of gelatin, dextrin, gum acacia and modified food starch,

said solid material having a particle size of from about 5 microns up to about 400 microns, said physically entrapped flavor oil being organoleptically compatible with said non-confined hydrophobic flavor oil;

c. From about 0.1 up to about 1 part by weight of a solid suspending agent selected from the group consisting of colloidal silica, xanthan gum and ethyl cellulose having a particle size of from about 0.008 up to about 0.030 microns, a surface area of from about 150 up to 400 $m^2/gm$ and a density of from about 2.0 up to about 3.0 lbs./cu.ft. and an all-enveloping mass of a chewable gum base within which said particles are substantially uniformly distributed whereby, as the chewing gum is chewed, the flavor is released at high flavor intensity substantially evenly and uniformly over an extended chewing time.

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3,920,850

## METHOD OF PRESERVING AND PACKAGING CHEESE

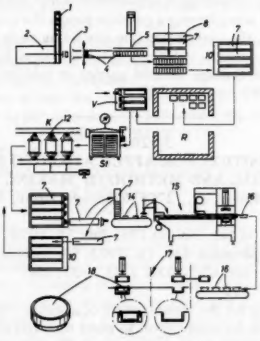
Gottfried Hain, Lehen; Christian Pellikan, Rott, Inn, and Hans Haas, Lehen, all of Germany, assignors to ALPMA Alpenland-Maschinenbau Hain & Co. KG, Rott, Inn, Germany

Filed Apr. 23, 1973, Ser. No. 353,636

Claims priority, application Germany, Apr. 21, 1972, 2219577

Int. Cl.[2] A23C *19/14*

U.S. Cl. 426—394 1 Claim



1. A method of preserving and packaging pieces of soft cheese, comprising the steps of wrapping each piece of cheese in foil, placing a plurality of pieces of cheese so wrapped in a hermetically sealable container, allowing said pieces to age for a period on the order of weeks in said container without sealing same, thereafter hermetically sealing the container, placing the sealed container in a sterilization chamber and exposing same in said chamber to an elevated sterilization temperature for a period of 30 to 50 minutes, withdrawing the container from said chamber at said elevated temperature, cooling the container with said pieces inside, removing the wrapped pieces from the container, and immediately inserting said pieces with their foil wrappings in airtight packages.

3,920,851

## LIMONOATE:NAD(P) OXIDOREDUCTASE AND DEBITTERING OF CITRUS JUICES AND OTHER PRODUCTS

Shin Hasegawa, Pasadena; Linda C. Brewster, Carson, and Vincent P. Maier, Newport Beach, all of Calif., assignors to The United States of America as represented by the Secretary of Agriculture, Washington, D.C.

Division of Ser. No. 461,181, April 15, 1974. This application Mar. 5, 1975, Ser. No. 555,498

Int. Cl.[2] A23L *2/34*; A23B *7/10*

U.S. Cl. 426—51 7 Claims

1. The process for reducing the development of bitterness in citrus products and by-products, which comprises incorporating therewith the enzyme limonoate:NAD(P) oxidoreductase.

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3,920,852

## READY-TO-EAT CEREAL CONTAINING DEBITTERED SOY PRODUCTS

Gerhard J. Haas, Woodcliff Lake, N.J., assignor to General Foods Corporation, White Plains, N.Y.

Continuation of Ser. No. 202,690, Nov. 26, 1971, abandoned, which is a continuation of Ser. No. 827,047, May 22, 1969, abandoned. This application July 9, 1973, Ser. No. 377,230

Int. Cl. A23l *1/18*

U.S. Cl. 426—62 8 Claims

1. A ready-to-eat breakfast cereal containing a cereal grain, at least 0.5% to 30% of a soy protein source selected from the group consisting of soy flour, soy concentrate and soy isolate, an inactive yeast and malt, and wherein the concentration of yeast and malt based on the dry weight of soy is in an amount sufficient to reduce the beany-bitter flavor of the soy to give a palatable cereal.

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3,920,853

## PROTEIN FOOD PRODUCT

John Edward Middendorf, Affton; Doyle Hans Waggle, St. Louis, both of Mo., and Alan Cornell, Bloomfield, Conn., assignors to Ralston Purina Company, St. Louis, Mo.

Continuation of Ser. No. 124,739, March 16, 1971, abandoned. This application Nov. 14, 1973, Ser. No. 415,921

Int. Cl.[2] A23J *3/00*

U.S. Cl. 426—104 26 Claims

1. A method of preparing a structured protein food product having an arrangement of striated protein layers comprising the steps of:

a. freezing an aqueous slurry of a protein material having a solids content of at least about 5 percent by weight, to form ice crystal layers in said slurry thereby compressing and molding the protein material of the slurry into layers, and

b. heat setting the protein layers into an irreversible, substantially insoluble form by heating the frozen slurry to a temperature sufficiently high to allow the protein layers to irreversibly set and lower than a temperature at which the protein will degrade, thereby melting the ice crystal layers to form the structured protein food product.

26. A structured protein food product resembling cooked muscle tissue in appearance and texture comprising an arrangement of striated protein layers, said layers having lines of cleavage generally arranged in the same direction, said layers being composed of irreversibly heat set, substantially insoluble animal protein particles and having been arranged in striated fashion by ice crystal layers.

## 3,920,854
## PROCESS FOR PREPARING A COLORED POWDERED EDIBLE COMPOSITION

**Jean-Jacques Wuhrmann, Saint-Legier; Bernard Venries, Orbe, and Raymond Buri, Vevey, all of Switzerland, assignors to Societe d'Assistance Technique Pour Produits Nestle S.A., Lausanne, Switzerland**

**Filed Mar. 5, 1973, Ser. No. 338,239**
**Claims priority, application Switzerland, Mar. 14, 1972, 3686/72**
**Int. Cl.² A23L** *1/275*
**U.S. Cl. 426—250** **12 Claims**

1. A process for preparing a coloured powdered edible composition, consisting essentially of heating a powdered blend comprising a colouring agent and an edible substance comprising a crystalline hydrate to a temperature sufficiently high to release water of crystallisation from the hydrate the released water of crystallization diffusing throughout said blend to effect homogeneous coloration of said blend, the water of crystallisation present in the hydrate representing at least 0.1% by weight of the blend.

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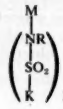
## 3,920,855
## FOOD CONTAINING NON-TOXIC FOOD COLORING COMPOSITIONS AND A PROCESS THEREFOR

**Daniel J. Dawson, Mountain View, Calif., and Josef Rudinger, Zurich, Switzerland, assignors to Dynapol, Palo Alto, Calif.**

**Filed Nov. 30, 1973, Ser. No. 420,545**
**Int. Cl.² A23L** *1/27*
**U.S. Cl. 426—250** **6 Claims**

1. A foodstuff having admixed therewith a color-imparting amount in the range of from 1 to 20,000 parts per million, basis foodstuff, of a coloring composition having the formula



wherein M is a nondegradable, nondigestable organic polymer backbone having at least two carbon atoms and dimensions such that the coloring composition molecule has a molecular weight of at least 1,000 and is too large to pass through the mucosa of the gastrointestinal tract, K is an optically chromophoric group,

is a sulfonamido linkage attaching K to M wherein R is hydrogen or a hydrocarbon of up to and including 6 carbon atoms, said sulfonamido linkage being positioned with its NR group being separate from but attached to M and its $SO_2$ group being attached to K, and wherein Z is a positive integer.

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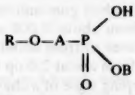
## 3,920,856
## CHEMICAL PEELING OF EDIBLE PLANT PRODUCTS

**Otto T. Aepli, Southgate; Malachy E. Sorgenfrei, Ypsilanti, both of Mich., and Daniel B. Curtis, Clarendon Hills, Ill., assignors to BASF Wyandotte Corporation, Wyandotte, Mich.**

**Filed Sept. 13, 1973, Ser. No. 396,842**
**Int. Cl.² A23L** *1/212, 1/216*
**U.S. Cl. 426—287** **6 Claims**

1. A process for removing the outer layers of tissue from edible plant products selected from the group consisting of tomatoes, potatoes, beets, carrots, onions, squash, peaches, apples, grapefruit segments, pears and figs comprising contacting said product at a temperature of from about 130°F. to 220°F. for a period of from 5 seconds to 15 minutes with an aqueous alkaline caustic solution containing from about 1 to 30 weight percent caustic concentration and from 0.05 weight percent to 1.00 weight percent, based on total weight of solution of an anionic surfactant represented by the formula:



wherein R is an alkyl or alkaryl group having from 8 to 18 carbon atoms in the alkyl chain, B is hydrogen or R—O—A— and A is either oxyethylene or a mixture of oxyethylene and oxyproplene groups wherein the weight ratio of oxyethylene to oxpropylene is 0.25:1 to 8:1 and the total oxyethylene and/or oxypropylene groups represent from about 30% to 80% of the total weight of the surfactant.

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## 3,920,857
## METHOD OF PREPARING A GRANULAR FREE-FLOWING LECITHIN PRODUCT

**Thomas G. Barker, Des Plaines; Larry L. Young, Roselle, and Joseph G. Endres, Downers Grove, all of Ill., assignors to Central Soya Company, Inc., Fort Wayne, Ind.**

**Filed Oct. 21, 1974, Ser. No. 516,608**
**Int. Cl.² A23C** *9/00*
**U.S. Cl. 426—307** **1 Claim**

1. In a process for preparing a granular, free flowing lecithin product, the steps of providing lecithin in a flowable condition by heating the same to a temperature in the range of abut 100°F. to about 130°F. and blending the same within about one minute following the heating step with a carrier selected from the class consisting of agglomerated non-fat dry milk and agglomerated whey having a particle size in the range of about 10–100 mesh, the carrier particle size being such that at least 10% but not less than 40% is retained on a No. 20 mesh screen, the percentage of said carrier in said product being from about 50% to about 70%.

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## 3,920,858
## COMPOSITION FOR APPLICATION TO PLANT MATERIAL AND METHOD OF MAKING SAME

**Sammie R. Morris, Jr., 2705 Eldorado Drive, Mobile, Ala. 36605**

**Continuation of Ser. No. 60,126, July 31, 1970, abandoned. This application Apr. 16, 1973, Ser. No. 351,614**
**Int. Cl.² A23K** *1/02, 1/22, 3/03*
**U.S. Cl. 426—319** **6 Claims**

1. A process for the manufacture of a stable composition of matter suitable for application to plant material prior to ensiling, said composition consisting essentially of 5–25% of minerals necessary for ruminant nutrition and not normally present in silage in sufficient quantities, 5–25% molasses at 80% solids, 30 to 75% water and 5 to 25% ammonia, said process comprising mixing said minerals with the water, adding the ammonia to the resulting mixture to dissolve a substantial portion of the ammonia in the water, removing heat liberated by dissolving the ammonia in the water and mixing molasses with the ammonia containing composition obtained thereby.

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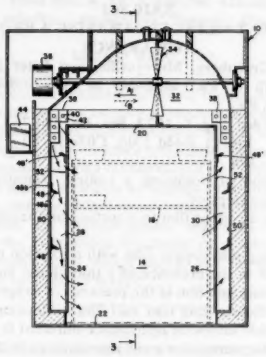
## 3,920,859
## METHOD FOR RECONSTITUTING FROZEN FOOD

**Lawrence H. Foster, 11 Ogden Road, Scarsdale, N.Y.**

**Filed Mar. 25, 1974, Ser. No. 454,777**
**Int. Cl.² A23C** *3/00*; **F26B** *21/06*
**U.S. Cl. 426—520** **8 Claims**

1. The method of reconstituting frozen food to a ready to serve state which comprises the steps of, delivering heat to the food at an average rate which is in excess of the rate at which heat will pass into the food, by supplying heated air to the food

at a controlled varying temperature and in a predetermined direction; periodically reversing the direction of air flow at predetermined intervals; and varying the temperature of said heated air between a maximum temperature for the food being treated and a lower temperature by cyclically raising the



temperature of the heated air to said maximum temperature, allowing the temperature to drop to said lower temperature and then raising the temperature again while the air is continuously supplied to the food and its flow direction is periodically reversed.

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**3,920,860**

## METHOD FOR PRODUCING MIXED CRYSTAL LAYERS FROM CDS AND CDSE

**Helmut Freller, and Brigitte Bauer, both of Nurnberg, Germany, assignors to Siemens Aktiengesellschaft, Munich, Erlangen, Berlin, Germany**

**Continuation of Ser. No. 76,320, Sept. 28, 1970, abandoned. This application Jan. 7, 1974, Ser. No. 431,577**

**Int. Cl.[2] B44D** *1/18*

**U.S. Cl. 427—87** **3 Claims**

**1.** A method of producing layers of crystals having the overall composition of $CdS_xSe_{1-x}$, wherein $0<x<1$, through a vaporization of the individual elements Cd, S, and Se from three separate crucibles and subsequent precipitation upon a collector in high vacuum in the absence of a carrier gas, which comprises maintaining a collector temperature between 120° and 400°C and adjusting the composition of each crystal layer being precipitated as desired, by changing the ratio of the crucible temperature $T_2$ for the S vaporizer to the crucible temperature $T_3$ for the Se vaporizer while holding the crucible temperature $T_1$ for the Cd Vaporizer and the collector temperature $T_4$ constant.

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**3,920,861**

## METHOD OF MAKING A SEMICONDUCTOR DEVICE

**Raymond Harkless Dean, Lawrenceville, N.J., assignor to RCA Corporation, New York, N.Y.**

**Filed Dec. 18, 1972, Ser. No. 316,014**

*Disclosure was also published under Trial Voluntary Protest Program on Jan. 28, 1975.*

**Int. Cl.[2] H01L** *7/00*; **B05D** *5/12*

**U.S. Cl. 427—88** **11 Claims**

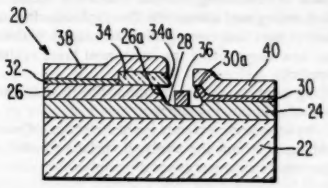
**1.** A method of making a semiconductor device comprising the steps of

coating a first surface area of a body of a single crystalline semiconductor material with a first metal film,

coating a second surface area of said body which is juxtaposed to said first surface area with a layer of a masking material with an edge of said masking layer extending at least to an edge of said first metal film,

etching away a portion of the material of the masking layer from said edge thereof, to expose a portion of the body between said edges of the first metal film and the masking layer,

etching a groove in said exposed portion of the body with the groove extending under at least one of the said edges




of the first metal film or the masking layer so that said edge extends in cantilever fashion over said groove, and depositing a second metal film on the bottom of said groove with an edge of said second metal film being in substantially transverse alignment with the said cantilevered edge.

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**3,920,862**

## PROCESS BY WHICH AT LEAST ONE STRIPE OF ONE MATERIAL IS INCORPORATED IN A LAYER OF ANOTHER MATERIAL

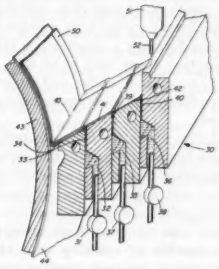
**Rudolph E. Damschroder, Sanibel, Fla., and Donald J. Hughes, Rochester, N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.**

**Filed May 1, 1972, Ser. No. 248,916**

*Disclosure was also published under Trial Voluntary Protest Program on Jan. 28, 1975.*

**Int. Cl.[2] H01F** *10/00*

**U.S. Cl. 427—131** **11 Claims**



**1.** A process for applying to at least one surface of a support at least one stripe of a first composition within a flow comprising at least one second and compatible composition, which comprises the steps of:

moving the support in a prescribed path;

forming a flow of said second composition directed toward said support;

while forming said flow, introducing at least one flow of said first composition as a stripe within said flow to form a composite flow; and

applying continuously said composite flow to the one surface of said moving support;

whereby said stripe extends in the direction of movement of said support and the exposed surfaces of said flow and stripe are generally coplanar.

**10.** A process for applying to at least one surface of a generally transparent, flexible support at least one stripe of a first

composition within at least the outermost layer of a number of layers of different compositions superposed in contacting relation, which comprises the steps of

moving the support in a prescribed path;

forming a laminar flow of each different composition into a composite flow directed toward said support in which the laminar flows are in a predetermined order and superposed in contacting relation with each other;

while forming said composite flow, introducing at least one flow of said first composition as a stripe within the laminar flow constituting the outermost layer relative to said support;

applying continuously said composite flow to the one surface of said moving support;

whereby said stripe extends in the direction of movement of said support and the exposed surface of said outermost layer and stripe are generally coplanar.

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**3,920,863**

## METHOD OF PROVIDING AND DEVELOPING HIDDEN ENTRIES

**Robert D. Fraik, Lincoln Township, Washington County, Minn., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.**

**Division of Ser. No. 23,036, March 26, 1970, Pat. No. 3,725,104, which is a continuation-in-part of Ser. No. 822,287, May 6, 1969, abandoned. This application Jan. 11, 1973, Ser. No. 322,621**

*Disclosure was also published under Trial Voluntary Protest Program on Jan. 28, 1975.*

**Int. Cl.[2] B41M** *5/12, 5/18*

**U.S. Cl. 427—145** **9 Claims**

4. A method of developing a latent image to provide feedback in a paper-based feedback system, said latent image comprising an image-forming reactant material selected from the group consisting of dithiooxamide, the N,N′-disubstituted derivatives of dithiooxamide, and an iron-complexing compound capable of forming a colored complex when reacted with the ions of an iron salt, said iron-complexing compound having a benzene ring and at least two hydroxyl groups substituted in adjacent positions on said ring, said method comprising contacting said latent image with a sheet-like means for dispensing an image-forming coreactant to transfer said image-forming coreactant from said sheet-like means to said latent image and to react and render said latent image visible.

5. A method of providing and developing hidden entries comprising the steps of:

1. providing intelligence in the form of preferentially radiation-absorptive image areas upon the surface of a significantly less radiation-absorptive paper-like original sheet;

2. juxtaposing said original sheet, a layer containing a normally stably solid vaporizable reactant material, and a receptor sheet, said receptor sheet being essentially free of materials capable of reacting with said vaporizable reactant material to produce contrasting colored complexes, said normally stably solid vaporizable reactant material being selected from the group consisting of: dithiooxamide, the N,N′-disubstituted derivatives of dithiooxamide, and an iron-complexing compound capable of forming a colored complex when reacted with the ions of an iron salt, said iron-complex compound having a benzene ring and at least two hydroxyl groups substituted in adjacent positions on said ring;

3. exposing the said surface of said juxtaposed original sheet to a heat source to induce in the said image areas a localized increase in temperature and a corresponding localized vapor transfer of said vaporizable reactant material from said layer to said receptor sheet;

4. permitting the vapor transferred, vaporizable reactant material to condense on said receptor sheet, thereby providing a storable latent image in localized areas of said receptor sheet corresponding to said image areas of said original sheet; and

5. contacting said storable latent image with a solid wax matrix means containing an image-forming coreactant whereby a portion of said image forming coreactant is transferred from said wax matrix means to said storable latent image and said image is rendered visible.

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**3,920,864**

## TRANSPARENT METAL FILM HAVING A BROWN-GRAY APPEARANCE

**Charles B. Greenberg, Murrysville, and Peter P. Harmon, Irwin, both of Pa., assignors to PPG Industries, Inc., Pittsburgh, Pa.**

**Filed Aug. 1, 1973, Ser. No. 384,763**

**Int. Cl. B44d** *5/06;* **C03c** *17/10*

**U.S. Cl. 427—169** **8 Claims**

1. A method of preparing a coated, transparent article comprising the steps of:

a. applying a copper film to a surface of a transparent substrate;

b. contacting said copper film with a solution containing a silver salt in the presence of a thiosulfate; and

c. maintaining said film in the presence of oxygen and water for a sufficient time film said film to develop a substantially stable luminous reflectance different from its luminous reflectance prior to its maintenance in the presence of oxygen and water.

6. A method of preparing a coated, transparent glass substrate having a brown-gray appearance when viewed toward its uncoated surface comprising the steps of:

a. applying a copper film to a surface of a clear glass substrate;

b. contacting said film with an aqueous alkaline solution comprising water and a silver salt in the presence of a thiosulfate; and

c. maintaining said film in the presence of oxygen and water for a sufficient time for said film to develop a brown-gray appearance as viewed through said clear glass substrate and to develop a stable luminous reflectance when so viewed through said clear glass substrate.

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**3,920,865**

## PROCESS OF HYDROPHORIZING HIGHLY DISPERSED METAL OR METALLOID OXIDES

**Siegmar Läufer, and Waldemar Roy, both of Rheinfelden, Germany, assignors to Deutsche Gold- Und Silber-Scheideanstalt Vormals Roessler, Frankfurt am Main, Germany**

**Continuation-in-part of Ser. No. 23,330, March 27, 1970, abandoned. This application Apr. 6, 1972, Ser. No. 241,761**

**Claims priority, application Germany, Mar. 29, 1969, 1916360**

**Int. Cl.[2] B05D** *3/04*

**U.S. Cl. 427—220** **27 Claims**

1. A process for making oxides of metals or metalloids hydrophobic, particularly oxides formed pyrogenically, comprising the steps of:

I. contacting oxide particles with a substantially dry inert gas stream so as to dry the particles and thus activate them, said contacting being carried out at temperatures between substantially 600° and 1000°C;

II. charging the dried and activated particles with at least one gas-phase organosilicon compound selected from the group consisting of (a) linear organopolysiloxanes (b) cyclic organopolysiloxanes (c) a mixture of (a) and (b) siloxanes and (d) a mixture of at least one of said organopolysiloxanes with an organohalogensilane, said charging being carried out at temperatures between substantially 25° and 650°C;

III. causing the dried particles to react with the organosilicon compounds or mixture at temperatures between substantially 350° and 650°C; and

IV. treating the reaction product with an inert gas stream at temperatures between substantially 125° and 500°C.

3,920,866

## PROCESS FOR THE MANUFACTURE OF TEXTILE PRODUCTS PRESENTING VARIED SECTIONS

**Michel S. M. Lefebvre, Saint Quentin, France, assignor to Omnium de Prospective Industrielle, Societe Anonyme, Neuville-Saint-Amand, France**

**Filed Dec. 4, 1973, Ser. No. 421,622**

**Claims priority, application France, Dec. 15, 1972, 72.44666**

**Int. Cl.[2] B44C** *1/22*

**U.S. Cl. 427—224** **2 Claims**

1. A process for texturing a textile thread of substantially constant cross section to give a product having sections of varying widths by selective removal of excess material therefrom, which process comprises subjecting discreet segments of the continuously running textile thread to a localized impregnation with water, acting as an inhibitor towards the removal of material, and thereafter removing a superficial layer of the material from the unimpregnated segments of the textile thread by the continuous treatment of passing said textile thread through a flame, which attacks only the unimpregnated segments of said textile thread.

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3,920,867

## WATER-INSOLUBLE, ADHERENT ALUMINA COATINGS ON HYDROPHOBIC SURFACES

**Bruce E. Leach, and George G. Hritz, both of Ponca City, Okla., assignors to Continental Oil Company, Ponca City, Okla.**

**Filed Apr. 30, 1973, Ser. No. 353,864**

**Int. Cl.[2] C23C** *3/00*

**U.S. Cl. 427—372** **9 Claims**

1. A method for producing adherent, water-insoluble alumina coatings on hydrophobic metallic surfaces selected from the group consisting of aluminum, aluminum alloys, anodized aluminum, chemically treated aluminum and chemically treated aluminum alloys by:

a. coating said hydrophobic metallic surfaces with an alumina disperson to produce alumina coated metallic surfaces said alumina dispersion containing at least 5 weight percent alumina as $Al_2O_3$, from about 7 to about 100 parts by weight of a halogenated organic acid containing from 2 to 3 carbon atoms per 100 parts $Al_2O_3$, from about 7 to about 100 parts by weight phosphate as $PO_4$ per 100 parts $Al_2O_3$ and water; and

b. drying said alumina coated metallic surfaces to produce said adherent water-insoluble alumina coatings on said hydrophobic metallic surfaces.

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3,920,868

## PROCESS FOR THE MANUFACTURE OF A CHEMICALLY BONDED NON-WOVEN FIBER MATERIAL IN SHEET FORM

**Klaus Hammer, Mainz; Herbert Porrmann, Konigshofen, and Klaus Jurgen Lucas, Hallgarten, all of Germany, assignors to Hoechst Aktiengesellschaft, Germany**

**Filed Oct. 19, 1972, Ser. No. 298,935**

**Claims priority, application Germany, Oct. 22, 1971, 2152596**

**Int. Cl.[2] C08J** *7/08*

**U.S. Cl. 427—354** **16 Claims**

1. A process for the manufacture of chemically bonded non-woven fiber material in sheet form, in which a polymer material in the form of a solution or dispersion is incorporated in the base material and the polymer material is coagulated, which comprises impregnating the fiber material with a liquid binder system containing

a. an aqueous dispersion of a synthetic thermoplastic elastomer,

b. an aqueous solution of a water-soluble filler selected from the group consisting of hexamethylene-tetramine, ammonium chloride, ammonium carbonate, magnesium chloride and mixtures thereof, in an amount of 20 to 110 percent by weight of the solids content of said elastomer,

c. an aqueous solution of at least one hydrophilic compound, in an amount of 5 to 20 percent by weight of the solids content of said elastomer,

d. an aqueous dispersion of a fat-like, hydrophobic compound having a carbon chain in the range of 10 to 24 carbon atoms and containing reactive groups selected from the group consisting of ethylene-urea, trimethylol urea, carboxyl, hydroxyl and amino groups, in an amount of 5 to 10 percent by weight of said hydrophilic compound,

e. an aqueous solution of an aminoplast precondensate crosslinking component, in an amount of 10 to 100 percent by weight of said hydrophilic component and

f. an inorganic cross-linking catalyst, heating said impregnated fiber material to the coagulation temperature of said elastomer, heating said impregnated fiber material to a temperature of 100° to 180°C for a period of 30 seconds to 45 minutes to cross-link the cross-linkable components of said system, washing said impregnated fiber material with water to remove said filler and drying said impregnated fiber material.

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3,920,869

## METHOD FOR PRODUCING A THREE LAYER COATING ON A GLASS CONTAINER AND THE RESULTING ARTICLE

**David Vivian Eckett, London, and Christopher Hillary Ellen, Barnet, both of England, assignors to United Glass, Ltd., United Kingdom**

**Filed Mar. 11, 1974, Ser. No. 450,218**

**Claims priority, application United Kingdom, Mar. 14, 1973, 12257/73**

**Int. Cl.[2] B05D** *1/36, 3/02;* **B32B** *17/06;* **C03C** *17/00*

**U.S. Cl. 428—35** **7 Claims**

1. A glass container having a three-layer surface coating, said coating comprising:

a. a layer of a metal oxide on the glass surface;

b. a layer of a fatty acid which is oleic acid, palmitic acid or stearic acid, superposed on the metal oxide layer;

c. a coating layer of a water insoluble organic compound comprising a polyolefine, an ethylene-vinyl acetate copolymer, or nylon, superposed on the fatty acid layer.

7. A process for treating a glass container which has been subjected to a hot end metal oxide treatment which comprises applying to the glass surface a coating of a fatty acid selected from the group consisting of oleic acid, palmitic acid and stearic acid whilst the glass is at a temperature within the range from 90°C to 130°C and then applying a coating of a water insoluble organic compound selected from the group consisting of a polyolefine, an ethylene-vinyl acetate copolymer and nylon whilst the glass is at a temperature within the range from 90°C to 150°C.

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3,920,870

## DECORATIVE PLACEMAT CONSTRUCTION WITH A GRAPHIC PATTERN INSERT

**Don Ackerman, Scotch Plains, N.J., and Robert Ira Schwartztol, Brooklyn Heights, N.Y., assignors to PerCare, Inc., Roselle, N.J.**

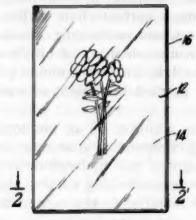
**Filed Jan. 18, 1974, Ser. No. 434,694**

**Int. Cl.[2] B32B** *3/02, 3/04;* **B65D** *27/14, 65/18*

**U.S. Cl. 428—46** **6 Claims**

1. In combination in a placemat, an opaque compliant backer sheet, a clear overlay sheet, means securing said overlay sheet and said backer sheet about less than all the periphery thereof, graphic bearing sheet means disposed between said backer and overlay sheet with said graphics disposed toward said overlay sheet, flap member means secured to said clear overlay sheet about the portion of the periphery thereof where said overlay sheet and said opaque backer are not

secured, and double sided adhesive strip means secured to the surface of one of said opaque compliant backer sheet remote




from said clear overlay sheet and said flap member, and disposed in proximate relation to said flap member.

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**3,920,871**

## WOVEN STRUCTURAL ELEMENT, METHOD OF MANUFACTURE THEREOF, AND METHOD OF MAKING A BOAT HULL THEREFROM

**Frederick M. Johnson, Austin, Tex., assignor to Insulex, Austin, Tex.**

**Filed Sept. 23, 1974, Ser. No. 508,690**
**Int. Cl. B32b *3/16***
**U.S. Cl. 428—54** **25 Claims**

**1.** A structural element comprising parallel rows of alternately oppositely undulated bundles of substantially untwisted fiberglass rovings and a series of parallel foamed plastic slats extending transversely of said rows and alternately under and over adjacent bundles to define a woven structural element of foamed plastic slats and bundles of fiberglass rovings, the weave of said woven structural element allowing said element to take the form of a curved surface.

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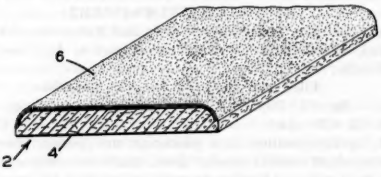
**3,920,872**

## CARPET-FACED WALLBOARD

**James C. Ollinger, Lancaster, Pa., assignor to Armstrong Cork Company, Lancaster, Pa.**

**Continuation of Ser. No. 305,471, Nov. 10, 1972, abandoned.**
**This application Nov. 29, 1974, Ser. No. 528,003**
**Int. Cl.[2] D04H *11/00*; D05C *17/00***
**U.S. Cl. 428—95** **4 Claims**




**1.** A wallboard structure which is composed of a rigid fiberboard base having on one surface thereof a plurality of perforations therein, an adhesive coating applied at a very low application rate to the surface of the fiberboard in such a manner as to not close over any of the perforation openings in the fiberboard, and a carpet material which is approximately ⅛ inch thick and which is composed of a plurality of needle-bonded fibers, the back surface of the carpet material, which is placed adjacent the adhesive-coated surface of the fiberboard, being an irregular surface and having a discontinuous coating of latex adhesive applied thereto in the form of dots of adhesive, said latex-coated surface of the carpet material being placed adjacent the adhesive coating of the fiberboard structure whereby the latex coating on the carpet and the adhesive coating on the fiberboard bond the carpet material to the fiberboard, the perforations of the fiberboard in the fiberboard-carpet material combination not having their openings bridged by either the adhesive coating of the fiberboard or the latex coating of the carpet so as to close off these openings which provide the carpet-covered fiberboard structure with good acoustical properties.

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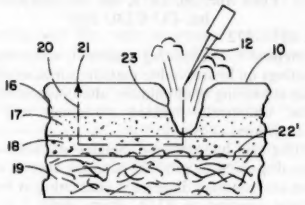
**3,920,873**

## ELECTROSENSITIVE RECORDING MEDIA

**Arthur D. Diamond, 6711 Monero Drive, Palos Verdes Peninsula, Calif. 90274**

**Filed Nov. 9, 1973, Ser. No. 414,459**
**Int. Cl.[2] B44D *1/02*; B32B *3/02***
**U.S. Cl. 428—195** **15 Claims**




**1.** An improved spark-dicharge recording medium comprising:

a base support;

a dark colored conductive layer on said support; and

a contrasting light colored surface layer combustible at the temperature developed during passage of marking current through said medium to selectively reveal the underlying dark layer with attendant generation of smoke, objectionable odor and combustion debris, wherein said medium includes an effective amount of a fragrance oil having a flash point above said temperature and a vaporization point at said temperature so as to vaporize without burning during said discharge to develop a pleasant aroma.

**14.** A method of reducing the persistence and quality of odor emanating from spark discharge recording medium comprising the steps of:

calendering the top surface of a paper support to a glossy, machine finish to reduce projection of combustible fibers into the superimposed layer;

coating a first dark conductive layer comprising conductive pigment dispersed in a film-forming binder thereon;

coating a second lightly-colored surface layer comprising white inorganic pigment dispersed in film-forming binder on the first layer; and

incorporating into at least one of said layers **0.01** to one percent by weight of a fragrance oil having a flash point below the temperature developed during spark discharge recording and volatile at said temperature.

3,920,874

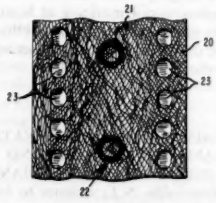
## SOFTENED FIBRILLATED SHEET

James J. Dempsey, Richmond, Va., and Drexel Kermit Smith, Kinston, N.C., assignors to E. I. Du Pont de Nemours & Co., Wilmington, Del.

Continuation of Ser. No. 442,405, Feb. 14, 1974, abandoned, which is a division of Ser. No. 98,676, Dec. 16, 1970, Pat. No. 3,811,979. This application Feb. 21, 1975, Ser. No. 551,962

Int. Cl.[2] D04H 3/00

U.S. Cl. 428—198 2 Claims




1. A softened nonwoven sheet of fibrillated organic polymeric material, said sheet having a surface pattern of spaced substantially continuous closed paths of fused abutting individual film fibril elements surrounding substantially unfused regions in the interior of the paths.

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3,920,875

## COATED POLYMERIC PAPER FILMS AND A METHOD OF PRODUCING THE SAME

Tosho Suzuki; Koichi Awano, and Ogino Katsuhisa, all of Tokyo, Japan, assignors to Nissan Boseki Kabushiki Kaisha, Japan

Continuation of Ser. No. 45,935, June 12, 1970, abandoned. This application May 30, 1972, Ser. No. 257,555

Claims priority, application Japan, July 11, 1969, 44-54555; June 8, 1970, 45-48691; Mar. 2, 1970, 45-17076

Int. Cl. B41m 5/14; D21h 5/00

U.S. Cl. 117—36.7 14 Claims

1. A process for producing a coated plastic film for synthetic paper, having a microporous surface layer for use in the graphic art which comprises the steps of:

A. coating at least one surface of a polymeric plastic film substrate, the surface of which is soluble or swellable in dimethylformamide, with a coating composition comprising (1) a resin prepared by using at least one of the main monomers from which the polymeric plastic film substrate is made; (2) a plasticizer for said resin; (3) an inorganic powder, and (4) dimethylformamide as the solvent to form a swollen coating layer on the said plastic film;

B. partially dissolving and swelling the plastic film substrate by the action of the dimethylformamide component of the coating composition thereon;

C. subsequently converting said swollen surface layer into a microporous surface layer by contacting said coated substrate with hot water in the order of 70° – 100°C whereby the dimethylformamide is leached from the swollen coating and substrate to provide a microporous surface coating on said substrate;

D. heat treating said microporous coated layer to strengthen same;

E. drying said coated plastic film.

3,920,876

## PROCESS FOR THE MANUFACTURE OF SHAPED BODIES FROM CELLULAR THERMOPLASTIC MATERIALS

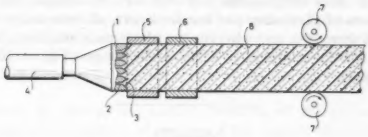
Walter Albert, Frankfurt am Main; Hans-Otto Schiedrum, Eppstein, Taunus, and Heinrich Tacheci, Bad Homburg, all of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt (Main), Germany

Filed May 15, 1973, Ser. No. 360,459

Claims priority, application Germany, May 19, 1972, 2224460

Int. Cl.[2] B32B 5/02; B29D 27/00

U.S. Cl. 428—295 4 Claims




1. In a process for the manufacture of a shaped body of a cellular material by pressing a thermoplastic material containing a blowing agent through a multiple-orificed die plate into a shaping die, the improvement which comprises pressing said thermoplastic material containing a blowing agent through a multiple-orificed die plate having orifices which enlarge in the direction of material flow, whereby a plurality of individual elongated elements of the thermoplastic material are formed and foaming of the individual elongated elements starts in the enlargements of the orifices, uniting the elongated elements at the latest at their exit from the multiple-orificed die plate, and passing the united elongated elements through a shaping die having a cross-sectional area which is at least as great as the cross-sectional area of the multiple-orificed die plate.

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3,920,877

## FULLY CURED CROSSLINKABLE PRESSURE SENSITIVE ADHESIVE MATERIALS AND METHOD OF MAKING SAME

Robert C. Barber, Baltimore; Robert J. Bettacchi, Columbia; C. Bent Lundsager, Ashton, and Louis L. Wood, Rockville, all of Md., assignors to W. R. Grace & Co., New York, N.Y.

Continuation-in-part of Ser. No. 159,000, July 1, 1971, abandoned, which is a continuation-in-part of Ser. No. 142,346, May 11, 1971, abandoned, which is a continuation-n-part of Ser. No. 59,003, July 28, 1970, abandoned. This application Mar. 23, 1973, Ser. No. 344,305

Int. Cl. B44d 1/50; C08f 3/00

U.S. Cl. 428—345 5 Claims

1. A pressure-sensitive, normally tacky adhesive comprising a substantially completely crosslinked or cured polythioether consisting essentially of the reaction product of a liquid polyene containing at least two unsaturated carbon to carbon bonds per molecule and a liquid polythiol containing at least two thiol groups per molecule and the total combined functionality of the unsaturated carbon to carbon bonds per molecule in the polyene and the thiol groups per molecule in the polythiol is greater than four, said polyene and said polythiol being of such molecular weight that upon complete crosslinking the polythioether has a theoretical crosslink density in the range 0.001–0.230 milliequivalents of crosslink sites per gram.

3,920,878

## PLASTICIZED POLYVINYL BUTYRAL INTERLAYERS

Robert H. Fariss, Amherst, and James A. Snelgrove, Monson, both of Mass., assignors to Monsanto Company, St. Louis, Mo.

Division of Ser. No. 371,014, June 18, 1973, Pat. No. 3,884,865. This application Nov. 18, 1974, Ser. No. 524,851
Int. Cl.[2] B32B 17/10
U.S. Cl. 428—437 5 Claims

1. Laminated glazing units comprising a polyvinyl butyral interlayer laminated between two rigid transparent sheets wherein the polyvinyl butyral interlayer has a molecular weight in the range of from 30,000 to 600,000, from 0 to 10% by weight residual ester groups, calculated as polyvinyl ester, and a hydroxyl content in the range of from 12 to 20% by weight calculated as polyvinyl alcohol which is plasticized with from 15 to 45 parts by weight of dihexyl adipate per hundred parts of polyvinyl butyral resin; wherein the sum of (a) 3.2 times the percent polyvinyl alcohol content and (b) the parts of plasticizer per hundred parts of resin is equal to or less than 100; and wherein the plasticized interlayer has a 100% tensile modulus at 72°F. in the range of from 100 to 1000 psi.

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3,920,879

## GLASS FIBER FILLED POLYAMIDE COMPOSITES

Leon Segal, and Hendrikus J. Oswald, both of Morristown, N.J., assignors to Allied Chemical Corporation, New York, N.Y.

Division of Ser. No. 194,469, Nov. 1, 1971, abandoned. This application June 4, 1973, Ser. No. 367,084
Int. Cl.[2] B32B 27/34
U.S. Cl. 428—474 7 Claims

1. A high impact resin sheet formable into shaped objects wherein the shaped sheet is a laminate comprising:

a. at least one layer of an amide polymer or copolymer resin at least 30% of which is an amide, said polymer or copolymer having recurring amide groups as an integral part of the main polymer chain and having a weight average molecular weight between about 3,000 and 25,000, said polymer or copolymer incorporating glass fiber having a length of at least about 1 inch fused to

b. at least one layer of another thermoplastic long chain synthetic polymer resin.

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3,920,880

## ELECTROSTATIC RECORDING MATERIAL

Toyomi Akiyama, Sakai; Taiji Higaki, Nishinomiya; Eiichiro Shiratsuchi, Tokyo; Yoshiyuki Ishibashi, and Eijiro Tagami, both of Yokkaichi, all of Japan, assignors to Japan Synthetic Rubber Co., Ltd. and Kanzaki Paper Manufacturing Co., Ltd., both of Tokyo, Japan

Filed Sept. 7, 1973, Ser. No. 396,253
Claims priority, application Japan, Sept. 5, 1972, 47-88838
Int. Cl.[2] B44D 1/18
U.S. Cl. 428—500 19 Claims

1. An electrostatic recording material obtained by coating a base sheet with a composition comprising (I) 10 to 90 parts by weight (as solids) of at least one member selected from the group consisting of

A. an aqueous solution of an amine or ammonium salt of a copolymer having a film-formability at a temperature not higher than 70°C and composed of

a. 8 to 50 mole percent (in terms of free carboxyl group) of a carboxyl group-containing ethylenically unsaturated monomer and

b. 92 to 50 mole percent of at least one monomer selected from the group consisting of an ethylenic monomer and a conjugated diolefinic monomer and

B. an aqueous dispersion of a polymer having a film-formability at a temperature not higher than 70°C prepared by polymerizing

a'. 100 parts by weight of at least one monomer selected from the group consisting of an ethylenic monomer and a conjugated diolefinic monomer in the presence of

b'. 1 to 200 parts by weight (as solids) of an aqueous solution of an amine or ammonium salt of a copolymer composed of

i. 8 to 50 mole percent (in terms of free carboxyl group) of a carboxyl group-containing ethylenically unsaturated monomer and

ii. 92 to 50 mole percent of at least one monomer selected from the group consisting of an ethylenic monomer and a conjugated diolefinic monomer;

(II) 90 to 10 parts by weight (as solids) of an aqueous dispersion of a water-insoluble homopolymer or copolymer having no film-formability at a temperature not higher than 70°C and having a weight average particle size of 1 to 20$\mu$ prepared by emulsion or suspension-polymerizing at least one monomer selected from the group consisting of an ethylenic monomer and a conjugated diolefinic monomer in an aqueous medium and then drying the resulting assembly.

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3,920,881

## TEXTILE FINISH USING A COMBINATION OF AN AMINOPLAST RESIN AND MONOMETHYLOLDICYANDIAMIDE

Philip B. Roth, Somerville, N.J., assignor to American Cyanamid Company, Stamford, Conn.

Filed July 2, 1973, Ser. No. 375,572
Int. Cl.[2] D06M 15/54, 15/70
U.S. Cl. 428—526 12 Claims

1. A process for improving wrinkle resistance, with minimal loss in tensile strength and abrasion resistance, of cellulosic textile materials which comprises:

applying to the material an effective amount for improving wrinkle resistance with minimal loss in tensile strength and abrasion resistance of a tad bath of monomethyloldicyandiamide, aminoplast resin, a catalytic amount of an accelerator and less than 4% hydrochloric or acetic acid based on the weight of the tad bath and

heating the material to cure the composition to a water-insoluble state.

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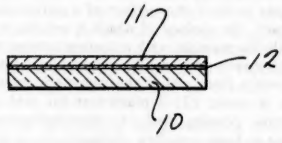
3,920,882

## N-TYPE DOPANT SOURCE

Doulatabad A. Venkatu, Toledo, Ohio, assignor to Owens-Illinois, Inc., Toledo, Ohio

Division of Ser. No. 351,348, April 16, 1973. This application Sept. 5, 1974, Ser. No. 503,303
Int. Cl.[2] B32B 9/04
U.S. Cl. 428—539 4 Claims




1. A solid dopant source for vapor phase transport of an N-type dopant at elevated temperatures comprising a porous, inert, rigid, dimensionally stable, refractory support impregnated with a dopant component comprising aluminum metaphosphate, arsenic oxide, or antimony oxide, said dopant component being present in the proportion of at least about 20 parts by weight per 100 parts of said support.

4. A method for forming a solid dopant source for vapor phase transport of phosphorus oxide at elevated temperatures comprising the steps of:

impregnating a porous, inert, rigid, dimensionally stable, refractory support with a solution which is in-situ ther-

mally reactable to form aluminum metaphosphate, and heating the impregnated support at a temperature and for a time to form aluminum metaphosphate in-situ.

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**3,920,883**

## LIQUID COSMETIC COMPOSITION OF A TWO-PHASE TYPE

**Junichi Yamada, Kamakura; Sanae Kubo, Omiya, and Isao Hirano, Yokohama, all of Japan, assignors to Shiseido Co., Ltd., Japan**

**Filed Nov. 15, 1972, Ser. No. 306,954**
**Int. Cl.[2] A61K** *7/02, 7/40, 31/74, 31/76*
**U.S. Cl. 424—78** **4 Claims**

**1.** A liquid cosmetic composition of a two phase type, which comprises:

1. up to about 95% by weight of an aqueous phase substantially comprised of water and at least one organic liquid selected from the group consisting of ethyl alcohol, N-methyl pyrrolidone/and isopropyl alcohol,
2. up to about 95% by weight of an oil phase in the form of spheres having diameters of 0.1 mm to 1.0 cm dispersed in said aqueous phase, said oil phase being substantially comprised of at least one member selected from the group consisting of liquid paraffin, squalane, 2-hexyldecyl palmitate, 2-octyldodecyl myristate, di-2-hexyldecyl adipate, di-2- ethylhexyl sebacate, olive oil, tsubaki oil, mink oil, isostearic acid, oleic acid, oleyl alcohol and a polypropyleneglycol butyl ether having a polymerization degree of approximately 40, and
3. not greater than approximately 50% by weight of finely divided solid particles insoluble in the liquid ingredients (1) and (2) set forth above, said solid particles having particle sizes of less than about 100 micron and being adsorbed on the interface between said aqueous phase (1) and said oil phase (2), said solid particle being selected from at least one member selected from the group consisting of talc, kaolin, iron oxide, magnesium oxide, zinc oxide,/zinc peroxide, titanium oxide, precipitated calcium carbonate, calcium secondary phosphate, aluminium hydroxide, antimony oxide, alumina, barium sulfate, silicic acid anhydride, magnesium metasilicate aluminate, silica-alumina, bismuth oxychloride, microcrystalline cellulose, fish scale, polyvinyl chloride and poly-Ω-lauryllactam

the proportion in the amount of water to the organic liquid in said aqueous phase (1) being such that the difference in specific gravity between said aqueous phase (1) and said oil phase (2) is not greater than 0.04 and wherein a spreading coefficient S defined as having the following formula is negative,

$$S=\gamma_w-\gamma_o-\gamma_{ow}$$

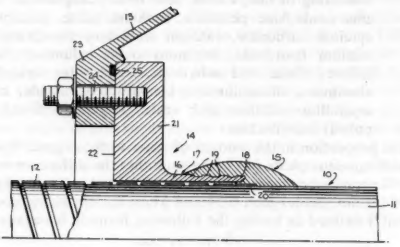
wherein $\gamma_o$ and $\gamma_w$ are surface tensions of the oil and the homogeneous mixture of water and the organic liquid respectively, and $\gamma_{ow}$ is an interfacial tension between the oil and the homogeneous mixture of water and the organic liquid.

3,920,884

## PRESSURIZED CABLE ACCESSORY CONNECTOR

Vittorio Buroni, Milan, Italy, assignor to Industrie Pirelli Societa Per Azioni, Milan, Italy

Filed May 1, 1974, Ser. No. 465,829
Claims priority, application Italy, May 23, 1973, 24443/73
Int. Cl.[2] H02G *15/24*
U.S. Cl. 174—21 R 9 Claims



1. In an electric cable interconnection with an accessory therefor, said cable having a metal sheath containing an insulating fluid and said accessory having a wall extending transversely to the length of said cable and having an entrance opening therethrough and with a radially extending face around said opening and said accessory, during use, having fluid under pressure at its interior, said cable having an end extending through said opening into said interior, the combination therewith of an annular element surrounding said sheath, said annular element having a radially outwardly extending flange portion and a tubular portion integral with said flange portion, said flange portion being secured to, and in fluidtight engagement with, said wall at said opening with a radially extending face of said flange against said face of said wall and said tubular portion extending from said flange portion into said interior of said accessory, and joining metal extending around said sheath at the interior of said accessory and bonded to both said sheath and said tubular portion of said element to form a fluid-tight seal between said sheath and said tubular portion.

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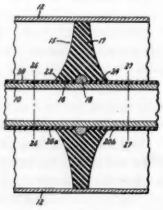
3,920,885

## HIGH-VOLTAGE, COMPRESSED-GAS-INSULATED BUS

Roy Nakata, Pittsfield, Mass., assignor to General Electric Company, Philadelphia, Pa.

Filed Mar. 14, 1975, Ser. No. 558,397
Int. Cl.[2] H01B *9/04*
U.S. Cl. 174—28 2 Claims



1. A high-voltage, compressed-gas insulated bus, comprising:

a. a conductor normally at high voltage,

b. a tubular metal sheath surrounding said conductor in radially-spaced relationship thereto.

c. a tubular coating of solid dielectric material on the exterior surface of said conductor,

d. an annular insulator surrounding said conductor for supporting said conductor within said sheath,

e. said insulator having a bore that intimately surrounds said coating and end faces located at opposite ends of said bore,

f. said coating having

i. a first portion extending continuously along said conductor from a first location axially spaced from said insulator at one side thereof, past one of said end faces to a region inside said bore and

ii. a second portion extending along said conductor continuously from a second location axially spaced from said insulator at the opposite side thereof, past the other of said end faces to said region inside said bore,

g. said coating containing a discontinuity located between said first and second portions,

h. said insulator having a portion projecting radially inwardly from said bore that fits within and fills said discontinuity so that no voids are present between said coating portions and said projecting portion of the insulator,

i. the remaining interface between said insulator bore and said coating being free of voids.

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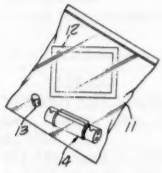
3,920,886

## KIT OF SPLICE COMPONENTS FOR ENCAPSULATING A CABLE SPLICE AND METHOD OF INSTALLING SAME

George W. Gillemot, 2331 20th St., Santa Monica, Calif. 90405, and John T. Thompson, 244 Loring St., Los Angeles, Calif. 90024

Filed June 16, 1972, Ser. No. 263,551
Int. Cl.[2] H02G *15/08*
U.S. Cl. 174—93 13 Claims



8. A kit of splice components for use in enclosing a splice connection to an installed power cable comprising: a slit soft metal connector adapted for assembly astride an exposed length of an installed cable and the exposed end of a branchout cable and clenchable against each thereof to form a strong highcapacity power splice, a pair of resilient elastomeric grommets formed with passages therethrough each slit longitudinally of one side and which passages are sized to snugly embrace a respective one of said installed and branchout cables to either side of the splice connection, said slits in said grommets permitting the edges of the slits to be expanded to receive the cables laterally therethrough, a valve-equipped resilient plastic housing comprising a slit tubular main shell expandable sufficiently for the lateral insertion of an installed power cable spliced to a branchout cable past said slit, said main shell including means for locking the edges of said slit closed with the interior end portions of said main shell seated snugly against the periphery of a respective one of said grommets, said main shell having a charging opening for potting compound, a slit tubular valve sleeve having a snug fit about said main shell and rotatable to a position closing said charging opening, and a package of polymerizable potting compound ingredients held segregated prior to use and sufficient

to charge the interior of said plastic housing and take a set to bond said components assembled about a cable splice junction.

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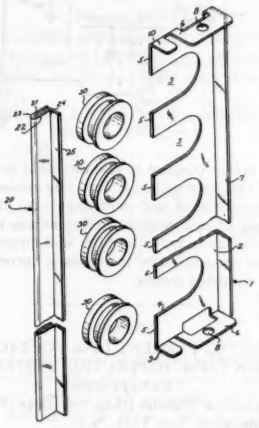
## 3,920,887
## HEATING ELEMENT ASSEMBLY

**William W. Kloos, East Brunswick; Charles L. Osterkorn, North Brunswick, and Salvatore M. Marino, East Brunswick, all of N.J., assignors to Fedders Corporation, Edison, N.J.**

**Filed Oct. 15, 1974, Ser. No. 514,380**
**Int. Cl.² H05B** *3/02*
**U.S. Cl. 174—148** **5 Claims**



**1.** An assembly for supporting an open coil heating element, said assembly comprising:

a. at least one cross-member having a generally strip-like configuration and having at least two cutouts therein, in a single row, extending from the top edge;

b. tab members formed at the sides of said cross-member, generally adjacent the top edge of said member;

c. a capping member, formed in a generally U-shaped configuration to form a channel, and a ridge formed on one leg of said U;

d. an insulator bushing seated in and partially captured by each of said cross-member cutouts and partially captured by said capping member, each bushing having an opening therein for said heating coil to pass through; said tab members holding against said capping member above said ridge, whereby said tab members secure said capping member to said cross-member.

**3.** A method for forming an assembly to support an open coil heating element comprising:

a. forming a cross-member, at least a portion of which is in a generally strip-like configuration having at least two cutouts therein, in a single row, extending from the top edge, and having tabs on each side, generally adjacent to the top edge;

b. forming a capping member in a U-shaped configuration, one leg of said U being provided with a ridge;

c. placing an insulator bushing within each of said cross-member cutouts;

d. placing said capping member on said generally strip-like portion;

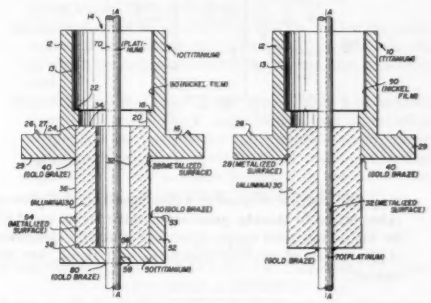
e. moving said capping member down over said cross-member so that the base of the U of said capping member rests upon the upstanding portion adjacent the cutouts in said cross-member; and

f. securing said capping member to said cross-member by said tabs, by bending said tabs above said ridge.

## 3,920,888
## ELECTRICAL FEED-THROUGH ASSEMBLY SUITABLE FOR ELECTRONIC DEVICES IMPLANTABLE IN A HUMAN BODY

**Harold N. Barr, Baltimore, Md., assignor to Nuclear Battery Corporation, Columbia, Md.**

**Filed June 4, 1974, Ser. No. 476,299**
**Int. Cl.² H01B** *17/26*
**U.S. Cl. 174—152 GM** **5 Claims**



**1.** An electrical feed-through assembly suitable for electronic devices implantable in a human body comprising

1. a titanium coupler including an annular skirt portion open at one end, an annulus integrally formed with the other end of said annular skirt having an inner diameter less than the inner diameter of said annular skirt, and an annular flange integrally formed with said annulus having a larger outer diameter than that of said annulus and having an inner diameter for its opening that is greater than the inner diameter of said annulus to define therebetween a shoulder,

2. an alumina sleeve having an outer diameter equal to the inner diameter of said annular flange and having one end thereof received within the opening of said annular flange and bearing against said shoulder,

3. liquid-tight and gas-tight compression joint means formed between said annular flange and the end of said alumina sleeve received therein and including the inner surface of said annular flange, the outer surface of said alumina sleeve received within said annular flange, and a braze material,

   a. said braze material being selected from the group consisting of gold, gold-nickel alloys and gold-palladium alloys,

4. a platinum wire extending through said alumina sleeve and projecting out of the other end thereof and extending through said titanium coupler and projecting out of the open end of said annular skirt portion, said wire being spaced from said titanium coupler and the inner surface of said annular skirt portion.

5. a nickel film on the inner surface of said annular skirt portion, and

6. liquid-tight and gas-tight means sealing said platinum wire in the other end of said alumina sleeve.

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## 3,920,889
## METHOD AND APPARATUS FOR CRISPENING VIDEO SIGNALS BY THE USE OF TEMPORAL FILTERS

**Denis John Connor, Kanata, Canada, assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.**

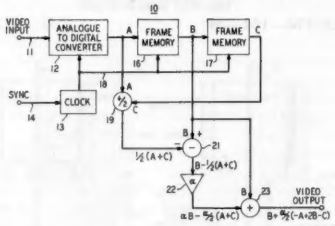
**Filed Dec. 5, 1974, Ser. No. 529,821**
**Int. Cl.² H04N** *5/21*
**U.S. Cl. 178—6.8** **17 Claims**

**1.** A method of enhancing the definition of the edges of moving objects in a video signal, or the like, which comprises the steps of:

temporarily storing successive frames of said video signal to furnish, at any instant of time, information concerning present, past and future video frames;

averaging a past and a future video frame;

subtracting said averaged frame from the present frame to generate a second derivative video signal; and then,




adding said second derivative video signal to the present video frame to thereby generate a video signal in which the higher temporal frequencies, and hence the definition of the edges of moving objects in said signal, are enhanced.

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**3,920,890**

## GRAPHIC DISPLAY OF RASTER SCANNING SYSTEM OUTPUT SIGNALS

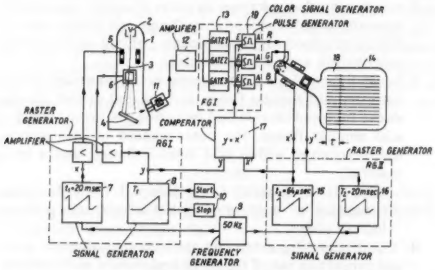
**Karl-Heinz Muller, Berlin, Germany, assignor to Siemens Aktiengesellschaft, Munich, Germany**

**Filed June 20, 1974, Ser. No. 481,359**

**Claims priority, application Germany, June 25, 1973, 2332684**

**Int. Cl.² H04N 7/18**

**U.S. Cl. 178—6.8** **8 Claims**




1. In a method for graphically displaying the output signals of a raster system in the form of a raster field by means of a picutre tube having a raster scan time which is less than that of the raster system, the improvement comprising selecting the scan time of the raster system as equal to the frame scan time of the picture tube, and keying the picture tube raster lines on at elements thereof which are spaced apart from the beginning of the raster lines by a distance which is proportional to the distance of the raster system lines from the edge of the raster system scanning field.

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**3,920,891**

## PEAK DETECTOR AND SAMPLE AND HOLD CIRCUIT

**Dong Woo Rhee, Williamsville, N.Y., assignor to GTE Sylvania Incorporated, Stamford, Conn.**

**Filed Feb. 27, 1974, Ser. No. 446,397**

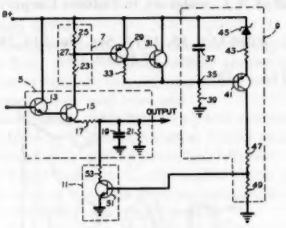
**Int. Cl.² H04N 3/16**

**U.S. Cl. 178—7.3 R** **13 Claims**

1. In a television receiver utilizing a video signal source, a peak detecting and sample and hold circuit comprising:

peak detecting and current sampling means coupled to said video signal source and providing a signal representative of the peak level of the video portion of said video signal;

threshold detecting means coupled to said sampling means, said means holding said signal representative of said peak level of said video portion of said video signal for a time period after said peak level of said video portion of said video signal changes; and




switching means coupled to said threshold detecting means and intermediate said peak detecting means and a potential reference level, said switching means effecting a shift in output of said peak detecting means in accordance with a change in potential from said threshold detecting means as determined by variations in current flow in said current sampling means.

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**3,920,892**

## ALTERNATING CURRENT LINE VOLTAGE SUPPLY ISOLATION USING DEFLECTION SYSTEM OUTPUT TRANSFORMER

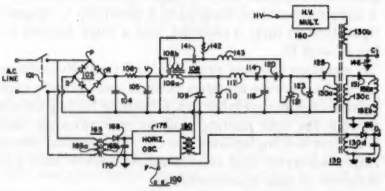
**Wolfgang Friedrich Wilhelm Dietz, New Hope, Pa., assignor to RCA Corporation, New York, N.Y.**

**Filed Apr. 12, 1974, Ser. No. 460,648**

**Claims priority, application United Kingdom, Oct. 23, 1973, 49217/73**

**Int. Cl.² H04N 3/18**

**U.S. Cl. 178—7.3 R** **10 Claims**




1. A system for isolating a source of reference potential within a television receiver from the alternating current line voltage source from which power for said receiver is derived, comprising:

first and second terminals;

rectifying, filtering and storage means coupled to said terminals and to said alternating current line voltage source for rectifying, filtering and storing said alternating current line voltage to provide at said first terminal a first direct current voltage supply with respect to said second terminal;

switching means including first and second bidirectionally conductive switches coupled to a deflection winding for

generating deflection current in said deflection winding, said first switch being direct current coupled to said first and second terminals;

a first winding coupled to said switching means for having induced therein current flow in response to operation of said switching means; and

a second winding magnetically coupled to said first winding and electrically isolated therefrom for having induced therein voltage variations in response to said current flow in said first winding, said second winding being coupled to said source of reference potential for having said voltage variations induced therein with reespect to said reference potential.

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**3,920,893**

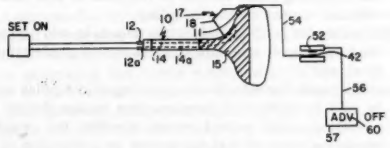
**TELEVISION APPARATUS TO PROVIDE SUPPLEMENTARY DISPLAY IMAGES**

**Elliott T. Belmont, R.F.D. 56, Katie Ford Road, Chatham, Mass. 02633**

**Filed July 1, 1974, Ser. No. 484,941**

**Int. Cl.[2] H04N** *5/44*

**U.S. Cl. 178—7.5 R** **5 Claims**




1. In a television receiver system including a cathode ray tube and an on-off switch, the improvement comprising:

display means disposed with said tube for displaying an auxiliary message on the screen area of said tube;

switching means for interconnecting said display means with the high voltage anode of said tube, to energize and illuminate said display means when said switching means are closed and for disconnecting said display means from said anode when said switching means are opened; and

actuating means interconnected with the on-off switch of said system for opening said switching means to deenergize said display means in response to said on-off switch being turned on and for closing said switching means to energize said display means in response to said on-off switch being turned off.

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**3,920,894**

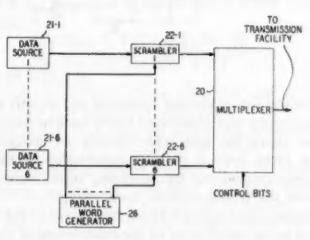
**PSEUDO-RANDOM PARALLEL WORD GENERATOR**

**Dorrel Roosevelt Shirley, Staten Island, N.Y., and Gilbert Johnson Stiles, Sr., Wayside, N.J., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.**

**Filed Mar. 11, 1974, Ser. No. 450,171**

**Int. Cl.[2] H04B** *1/10*; **H04L** *9/04*; **H03K** *13/32*

**U.S. Cl. 178—22** **6 Claims**




6. A method for producing in a parallel format a pseudo-random binary signal sequence that is the same as a predetermined pseudo-random sequence selectively derived from a series connected pseudo-random word generator comprised of an *n*-cell feedback shift register having at least one modulo-2 adder in the feedback path, comprising the steps of

reconnecting the *n*-cells of said shift register to form a parallel *m*-rail output version of said series connected word generator, the composite *m*-rail output signal that is collectively developed on the *m* parallel output rails having a pseudo-random binary sequence that is normally the same as the pseudo-random output sequence of said series connected word generator,

applying clock pulse signals to each of the cells of the reconnected circuit at a rate that is normally $1/m$ times the rate at which the series connected word generator is clocked, and

skipping a normal clock pulse period after a preselected number of input clock pulse signals and alternatively advancing the parallel format, pseudo-random, binary signal sequence by a predetermined additional amount equivalent to the advance produced in the series word generator by a single input clock signal thereto.

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**3,920,895**

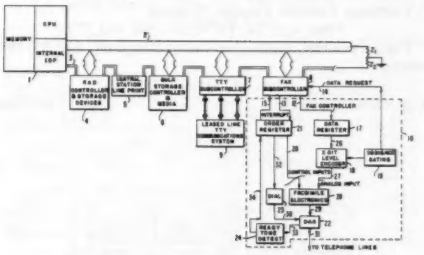
**COMMUNICATIONS SYSTEMS HAVING A SELECTIVE FACSIMILE OUTPUT**

**Bruno J. Vieri, Dallas, and Carl D. Friedman, Richardson, both of Tex., assignors to Xerox Corporation, Stamford, Conn.**

**Filed Mar. 29, 1974, Ser. No. 456,426**

**Int. Cl.[2] G06F** *3/14*; **H04L** *15/34*; **H04N** *1/32*

**U.S. Cl. 178—26 R** **47 Claims**



1. Facsimile controller apparatus comprising:

means for receiving order information for controlling operations within said facsimile controller apparatus;

means for receiving data information representing digitally encoded message scan line information to be forwarded to a peripheral employing facsimile equipment; and

means responsive to said order information and said data information for effecting a dialing of the location of a designated peripheral employing facsimile equipment through telephone network means, communicating therewith and forwarding message information in a facsimile format thereto, said facsimile format differing in format from said digitally encoded scan line information.

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**3,920,896**

**COMMUNICATIONS SYSTEMS HAVING A SELECTIVE FACSIMILE OUTPUT**

**Sarah-Ann Bishop, Rochester, N.Y.; Joseph D. Marmion, Denton, Tex., and Alan R. Montante, Penfield, N.Y., assignors to Xerox Corporation, Stamford, Conn.**

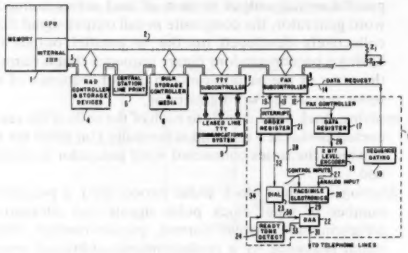
**Filed Mar. 29, 1974, Ser. No. 456,427**

**Int. Cl.[2] G06F** *3/14*; **H04L** *15/34*; **H04N** *1/32*

**U.S. Cl. 178—26 R** **70 Claims**

1. Information translating apparatus comprising:

means for receiving input message information in an ASCII code format; and



means for selectively translating said input message information into a digital code format representative of a dot matrix encoding of said input message information, said digital code being decodable into a synthesized analog baseband signal.

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**3,920,897**

## ELECTRIC PULSE TRAIN GENERATORS AND FREQUENCY SYNTHESISERS

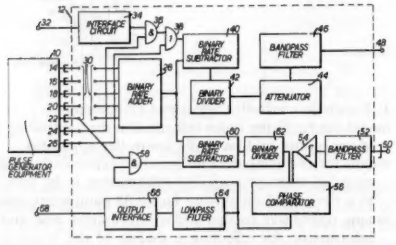
**James Grant, Northampton, and Clive Rowland Warburton, Coventry, both of England, assignors to The General Electric Company Limited, London, England**

**Filed Apr. 24, 1974, Ser. No. 463,777**

**Claims priority, application United Kingdom, Apr. 25, 1973, 19600/73**

**Int. Cl.[2] H04L** *27/10*

**U.S. Cl. 178—66 R** **14 Claims**



1. An electric pulse train generator arrangement comprising generating means for generating a plurality of interlaced pulse trains each having a different repetition rate, first means for deriving from at least one of said pulse trains a first intermediate pulse train, second means selectively to pass at least one of said pulse trains in dependence upon a control signal applied thereto to form a second intermediate pulse train having a lower pulse repetition rate than said first intermediate pulse train, and subtraction means for cancelling from said first intermediate pulse train one pulse in respect of each pulse in said second intermediate pulse train to provide an output pulse train having a repetition rate equal to the difference in repetition rates between said first and second intermediate pulse trains.

**3,920,898**

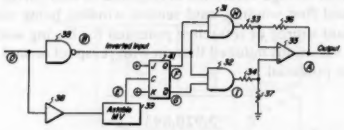
## NON-SYNCHRONOUS DUOBINARY ENCODING

**John D. Torpie, Dallas, Tex., assignor to Xerox Corporation, Stamford, Conn.**

**Filed May 30, 1974, Ser. No. 474,751**

**Int. Cl.[2] H04N** *7/00*

**U.S. Cl. 178—68** **16 Claims**



1. An encoder for encoding data signals of the type that make successive excursions from a predetermined level as a function of time; said encoder comprising the combination of bipolar means selectively operable in inverting, non-inverting, and quiescent modes; and

control means coupled to said bipolar means for controlling the operating mode thereof in response to said data signal; said control means including

first means for holding said bipolar means in said quiescent mode whenever said data signal is at said predetermined level, and

second means for selectively operating said bipolar means in said inverting and non-inverting modes during said excursions, said second means selecting the operating mode for each of said excursions as a function of the operating mode selected for any immediately preceding excursion and the amount of time elapsed since said preceeding excursion.

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**3,920,899**

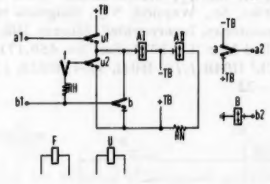
## METHOD AND APPARATUS FOR THE TESTING OF SINGLE CURRENT-DOUBLE CURRENT CONVERTER CIRCUITS AND ASSOCIATED TRUNK LINES IN CENTRALLY CONTROLLED DATA SWITCHING INSTALLATIONS

**Ekkehard Riedel; Lothar Schmid, and Fritz Giebler, all of Munich, Germany, assignors to Siemens Aktiengesellschaft, Berlin & Munich, Germany**

**Continuation of Ser. No. 243,899, April 13, 1972, abandoned, which is a continuation of Ser. No. 883,772, Dec. 10, 1969, abandoned. This application Feb. 27, 1974, Ser. No. 446,474**

**Int. Cl. H04I** *25/02*

**U.S. Cl. 178—69 G** **8 Claims**



1. A method for producing reflected test signals for testing converter circuits and associated trunk lines in data switching exchanges where the converter circuits are assigned to the subscriber lines over a through-connection network, said testing being carried out by analyzing signal waveforms reflected from the tested circuits, comprising:

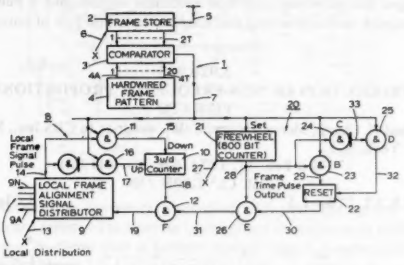
transmitting a test signal formed by a pulse to the converter circuit to be tested prior to the completion of the connection in said through-connection network and

causing said test signal to be reflected by said tested converter circuit.

## 3,920,900
## TELECOMMUNICATIONS RECEIVERS

**Laurence Keith Fineman, Bath, England, assignor to The Post Office, London, England**

**Filed Aug. 28, 1974, Ser. No. 501,244**
**Claims priority, application United Kingdom, Sept. 5, 1973, 41750/73**
**Int. Cl.² H04L** *7/00*
**U.S. Cl. 178—69.5 R** **7 Claims**




1. Apparatus for reframing a frame structured communication signal comprising: signal detecting and generating means connected to receive a frame structured communication signal for generating line frame synchronization signals in response to the detection of frame synchronization patterns in said frame structured communication signal;

main local frame structure generating means for generating main local frame timing signals for receiving and decoding said frame structured communication signal;

reserve local frame structure generating means for generating reserve local frame timing signals, said reserve local frame structure generating means being connected to be reset by each occurrence of said line frame synchronization signals;

decision means;

first and second persistence check means respectively coupled to said decision means, said first persistence check means operable in response to persistent non-coincidence of line frame synchronization signals and main local frame timing signals to deliver a first output to said decision means and said second persistence check means operable in response to the persistent coincidence of reserve local frame timing signals and line frame sychronization signals to deliver a second output to said decision means, said decision means being operable in response to receipt of said first and second outputs simultaneously to reset said main local frame structure generating means in alignment with the reserve local frame timing signal.

## 3,920,901
## GENERATOR USED FOR TIME SYNCHRONIZATION IN VIDEO-TELEPHONE

**Michael A. Boehly, Rochester, and Uno Randmere, Victor, both of N.Y., assignors to Stromberg-Carlson Corporation, Rochester, N.Y.**

**Filed May 7, 1974, Ser. No. 467,761**
**Int. Cl.² H04N** *5/06;* **H04M** *11/06*
**U.S. Cl. 178—69.5 G** **10 Claims**

1. A synchronous signal generator for use in video-telephone systems; said generator comprising:

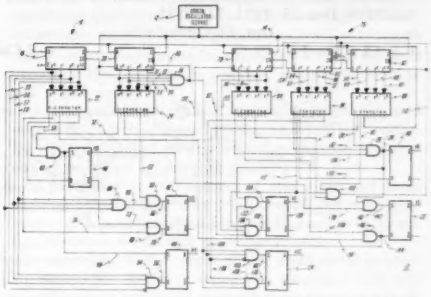
oscillator means including an output for generating signals having a stable first frequency of pulses;

first binary counting means, connected to the output of said oscillator means, for counting said first frequency of pulses and producing a first count of pulses;

second binary counting means, connected to the output of said oscillator means and to an intermediate output of said first counting means, for counting said first frequency of pulses and producing a second count of pulses;

decoding means connected to said first and second counting means for providing output signals at selected integral counts of said first frequency of pulses; and

signal means connected to at least one output of said decoding means for generating at least one control signal synchronously with said output signals,

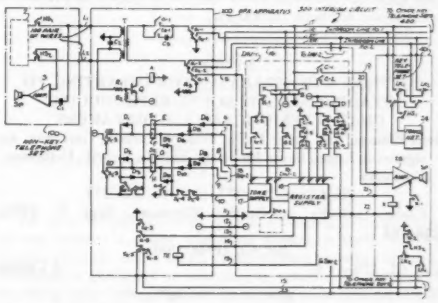


said first and second counting means cooperating to produce at least third and fourth counts of pulses which are intermediate said first and second counts of pulses, respectively.

## 3,920,902
## OFF-PREMISES STATION LINE CIRCUIT FOR A KEY TELEPHONE SYSTEM

**Kazuaki Matsuo, Kawasaki, Japan, and Stephen E. Kerman, Merrick, N.Y., assignors to Nippon Tsu Shin Kogyo K.K., Japan and TIE/Communications Inc., Stamford, Conn.**

**Filed Apr. 5, 1973, Ser. No. 348,279**
**Int. Cl.² H04M** *9/00*
**U.S. Cl. 179—99** **4 Claims**



1. Key service unit apparatus for enabling intercommunication between a non-key telephone set and at least one key telephone set in a key telephone system, by use of at least one intercom line circuit connected to said key service unit, comprising, in combination,

input and output terminal means;

means, including at least one normally released first relay for automatically testing and connecting to said intercom line circuit when said circuit is idle, and for preventing establishment of a connection in response to a line busy status indication from said tested intercom line circuit;

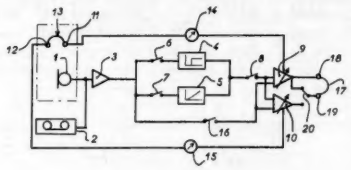
means, including a normally released second relay operated by an off-hook condition at said non-key telephone set, for establishing an intercom line testing path through said first relay, and for supplying signals, representative of dial pulses generated at said non-key telephone set to said selected idle intercom line; and

means, including make contacts of said first and second relays, for electrically connecting said input and output terminal means.

## 3,920,903
## SPEECH-TRAINING DEVICE

Isi Beller, 98bis, Boulevard Haussmann, 75008 Paris, France

Filed July 31, 1973, Ser. No. 384,179
Claims priority, application France, July 31, 1972, 72.27589; Dec. 15, 1972, 72.44921
Int. Cl. G09b 19/04
U.S. Cl. 179—1 D 7 Claims

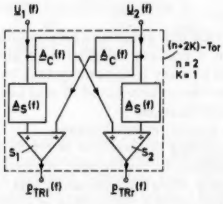


1. A speech training device comprising, an input transducer for converting sounds of human speech to corresponding electrical signals, a first and second filter, first and second output transducers for converting said electrical signals to sounds, and circuit means for alternatively connecting said filters to said input transducer for filtering said electrical signals and for alternatively connecting filters to said first and second output transducers for rendering said filtered electrical signals audible, said first filter comprising a high pass filter with a sharp cutoff frequency and a cutoff frequency range in the order of between 6,000 to 8,000Hz and an attenuation below its cutoff frequency of about 40dB greater than its attenuation above its cutoff frequency, said second filter comprising a variable high pass filter with variable frequency response characteristics having its maximum attenuation at frequencies in the order of between about 800Hz to 1,500Hz and below and gradually increasing at a controllably variable rate to about between 10dB and 40dB above its maximum attenuation at about 10,000 Hz.

## 3,920,904
## METHOD AND APPARATUS FOR IMPARTING TO HEADPHONES THE SOUND-REPRODUCING CHARACTERISTICS OF LOUDSPEAKERS

Jens Blauert, and Peter Laws, both of Aachen, Germany, assignors to Eugen Beyer Elektrotechnische Fabrik, Heilbronn, Germany

Filed Sept. 7, 1973, Ser. No. 395,371
Claims priority, application Germany, Sept. 8, 1972, 2244162
Int. Cl. H04r 5/00
U.S. Cl. 179—1 G 5 Claims

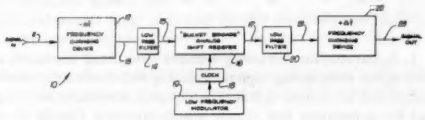


1. Method for creating sound signals at the eardrums of a listener by means of earphones, to correspond to sound signals which would be created at said eardrums of said listener in a predetermined acoustical environment in response to first electrical signals applied to a loudspeaker, comprising, in combination, the steps of measuring the amplitude and delay time of soundwaves at said eardrums of said listener as a function of frequency in response to electrical signals applied to said loudspeaker when said listener is in said acoustical environment in such a manner as to determine a corresponding desired transfer function; measuring the amplitude and delay time of soundwaves at said eardrums of said listener as a function of frequency in response to electrical signals applied to said earphones in such a manner as to determine a corresponding earphone transfer function; and furnishing an electrical network having a network transfer function corresponding to the ratio of said desired transfer function to said earphone transfer function, said electrical network having first input for receiving said first electrical signals and a pair of outputs; and connecting said earphones to said pair of outputs.

## 3,920,905
## PRODUCTION OF NON-FREQUENCY PROPORTIONAL VIBRATO

Paul H. Sharp, Sierra Madre, Calif., assignor to CBS Inc., New York, N.Y.

Filed Feb. 11, 1974, Ser. No. 441,031
Int. Cl.² G10H 1/04
U.S. Cl. 179—1 J 5 Claims



1. In apparatus for electronic superposition of vibrato upon electrical impulses having a spectrum extending throughout a substantial frequency range:

a. means forming an electrical input and and electrical output for said apparatus;
b. a first modulator for superimposing vibrato upon said electrical impulses with a depth of swing or frequency deviation substantially proportional to the frequency of the impulses;
c. a second modulator for superimposing vibrato upon said electrical impulses with a substantially constant frequency deviation;
d. means serially connecting said modulators between said electrical input and electrical output; and
e. common means for controlling said vibrato modulators in synchronism at a selected vibrato rate whereby the frequency swing of the superimposed vibrato of said modulators is algebraically additive controllably to change the characteristics of the vibrato spectrum from a linear frequency relationship.

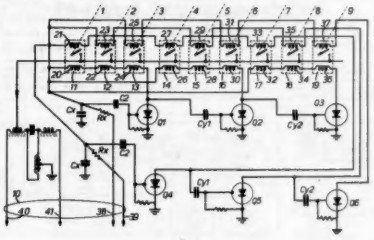
## 3,920,906
## WIRED BROADCASTING SYSTEMS

Eric John Gargini, West Drayton, England, assignor to Communications Patents Limited, London, England

Filed July 2, 1974, Ser. No. 485,065
Claims priority, application United Kingdom, July 5, 1973, 32047/73
Int. Cl.² H01H 47/32; G09B 5/04
U.S. Cl. 179—1 B 10 Claims

1. A wired broadcasting system comprising a plurality of programme signal sources, switch means for connecting a subscriber to a desired one of said programme signal sources and a signal cable extending between said switch means and said subscriber, said switch means comprising a plurality of electro-magnetically operable contacts, the electro-magnets comprising a plurality of coils, means for connecting said coils in groups such that each of the plurality of coils of an electro-magnet is connected in a separate group and means for controlling the flow of electric current through selected groups of coils thereby to actuate that contact associated with that electro-magnet the coils of which are included in the selected groups wherein the means for controlling the flow of electric current comprises thyristor semi-conductor devices arranged

to control passage of current by application thereto by a train of pulses, wherein the thyristors associated with one group of coils are arranged to operate in sequence in response to pulses applied to them over one control line in the subscriber's signal



cable and the thyristors associated with the other group of coils are arranged to operate in sequence in response to pulses applied to them over a further control line in a subscriber's signal cable.

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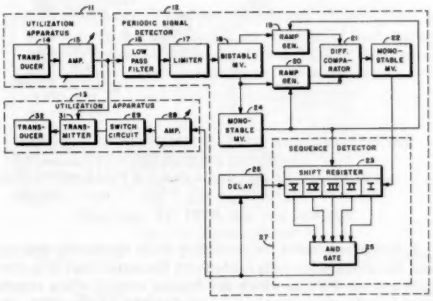
**3,920,907**

## PERIODIC SIGNAL DETECTOR

**Walter W. Mullen, Jr., Lynn Haven, and George L. Hooks, III, Panama City, both of Fla., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.**

**Filed July 3, 1974, Ser. No. 485,667**
**Int. Cl.[2] H04M** *3/40*
**U.S. Cl. 179—1 VC** **20 Claims**




**1.** A periodic signal detector, comprising in combination:

means for receiving a first signal of complex frequencies and for passing those frequencies thereof that are below a predetermined frequency as a second signal;

means connected to the output of said receiving and passing means for converting said second signal into a third signal having a substantially squarewave configuration that is corresponding thereto;

means having an input and a pair of outputs, with the input thereof connected to the output of said converting means for alternately producing a pair of oppositely polarized fourth and fifth signals at the outputs thereof in response to a predetermined directional transition of the squarewave configurations of said third signal, respectively;

means connected to one of the outputs of said oppositely polarized signal producing means for generating a substantially linearly increasing sixth signal in response to said fourth signal;

means connected to the other of the outputs of said polarized signals producing means for generating a substantially linearly increasing seventh signal in response to said fifth signal;

means connected to the outputs of said sixth and seventh signal producing means for comparing the magnitudes of said sixth and seventh signals and for producing an eighth signal that is proportional to the difference therebetween;

means connected to the outputs of said sixth and seventh signals comparing means for producing a ninth signal of predetermined duration in response and proportional to said eighth signal;

means connected to the other of the outputs of the aforesaid oppositely polarized signals producing means for producing a tenth signal of predetermined duration in response and proportional to said fifth signal;

means connected to the outputs of said ninth and tenth signals producing means for producing an eleventh signal whenever a predetermined program of successive binary signals occurs within said ninth signal; and

means connected to the output of said tenth signal producing means for timely resetting the aforesaid sixth and seventh signals producing means in response to said tenth signal.

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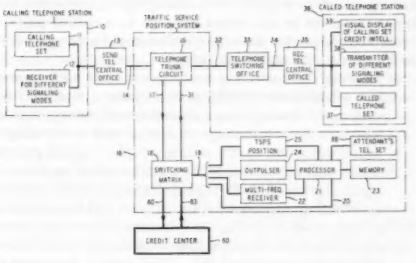
**3,920,908**

## BUYER CREDIT SERVICE FOR A TELEPHONE SYSTEM

**Constantine R. Kraus, 845 Mount Moro Road, Villanova, Pa. 19085**

**Filed June 25, 1974, Ser. No. 482,864**
**Int. Cl.[2] H04M** *11/04*; **G06K** *5/00*
**U.S. Cl. 179—2 CA** **22 Claims**




**21.** In a telephone credit circuit including a calling telephone station, a called telephone station, a traffic service position system, and a credit center storing preselected credit intelligence pertinent to said calling station, the method of enabling said calling station to obtain a service on credit through said traffic system from said called station as determined by said credit intelligence stored in said credit center, which method consists of:

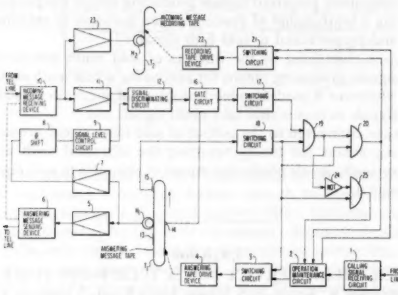
delivering said credit intelligence from said credit center through a connection thereof with said traffic system and thereby to said called station in accordance with identifying numbers of said calling and called stations recorded in said traffic system in response to an indication of a call received thereat and originating at said calling station for said called station to obtain said credit service therefrom; and

instructing said traffic system from said called station after evaluating said credit intelligence delivered thereto to connect said calling station through said traffic system to said called station thereby completing said credit service call to obtain said credit service from said called station and to disconnect said credit center from said traffic system thereby terminating the delivery of said credit intelligence from said credit center through said traffic system to said called station.

## 3,920,909
## AUTOMATIC TELEPHONE ANSWERING METHOD AND APPARATUS

**Hajime Furukawa, Tokyo, Japan, assignor to Pioneer Electronic Corporation, Tokyo, Japan**

**Filed July 24, 1973, Ser. No. 382,223**
**Claims priority, application Japan, July 24, 1972, 47-73393**
**Int. Cl.[2] H04M** *1/64*
**U.S. Cl. 179—6 R** **3 Claims**



**1.** In an automatic telephone answering apparatus which is normally in a standby state for receiving a calling signal and which includes starting means for completing a telephone line talking circuit in response to a calling signal, answering means for sending out an answering message to a calling party, and recording means for recording an incoming message from the calling party, the improvement:

a. wherein the answering message contains a message portion advising the calling party to utter a specified signal within a following first predetermined time period if he wishes to have a message recorded; and comprising

b. signal detecting circuit means coupled to said recording means and responsive to the occurrence of said specified signal during said first predetermined time period for maintaining the completion of said talking circuit and placing said recording means in an incoming message recording state, during a following second predetermined time period, to record the calling party's incoming message only if said specified signal occurs within said first predetermined time period.

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## 3,920,910
## AUTOMATIC TELEPHONE ANSWERING APPARATUS

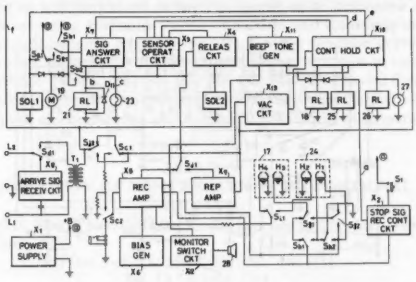
**Yuji Urayama, Yokohama, Japan, assignor to Victor Company of Japan, Ltd., Yokohama, Japan**

**Filed May 15, 1974, Ser. No. 470,012**
**Claims priority, application Japan, May 17, 1973, 48-54058**
**Int. Cl. H04m** *1/64*
**U.S. Cl. 179—6 R** **9 Claims**

**1.** In an automatic telephone answering apparatus coupled to a called side telephone set to operate cooperatively therewith and operating in response to the arrival of a call signal sent by a caller through a telephone line to send an answering message to the caller side, the combination of:

a first control circuit operating in response to a call signal which has arrived through a telephone line said signal being of the kind having the same recurrent period in which the duration of the ringing portion thereof may vary between different telephone systems to produce output pulses of the same period as those of said call signal and of a constant pulse width irrespective of the kind of call signal; and

a second control circuit operating upon being supplied with a predetermined number of the pulses from the first control circuit to place the apparatus in the answering



state of operation thereof by sending said answering message.

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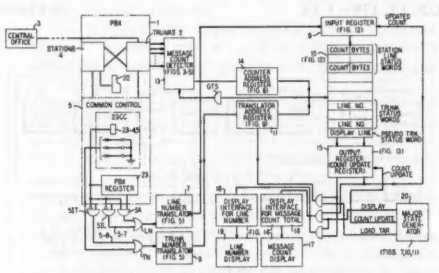
## 3,920,911
## HOTEL PBX ELECTRONIC MESSAGE BILLING ARRANGEMENT

**Frederic Lukas, Lancaster, Calif., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.**

**Filed July 5, 1974, Ser. No. 486,002**
**Int. Cl.[2] H04M** *15/10*
**U.S. Cl. 179—7.1 TP** **15 Claims**



**1.** An arrangement for recording in an electronic memory unit the charges for calls made from the statio lines of a common control PBX in which the remote central office returns message charging signals over the trunks to the PBX, the combination comprising

means for furnishing from said common control of said PBX the number of a station line and trunk employed on a call, means associated with said trunks for detecting the arrival of one of said message charging signals,

means responsive to the dialing of a station line number accompanied by a predetermined access code for generating a pseudo trunk number.

means alternatively controllable by said common control furnishing means and said pseudo trunk number generating means for allocating a respective storage word in said electronic memory,

means responsive to the furnishing of one of said station or one of said accompanied station numbers for storing said respective station number in said allocated storage word, means controlled by said detecting means for reading the contents of the associated one of said memory words,

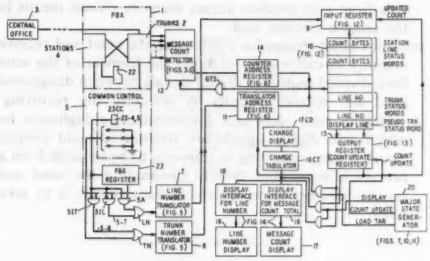
display means, and

means responsive to the dialing of said predetermined access code for selectively connecting said memory unit to said display means.

## 3,920,912
## HOTEL PBX ELECTRONIC MESSAGE BILLING ARRANGEMENT

**Harold Peter Anderson, and Carl Calvin Nielson, both of Boulder, Colo., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.**

**Filed July 5, 1974, Ser. No. 486,003**
**Int. Cl.[2] H04M** *15/10*
**U.S. Cl. 179—7.1 TP** **7 Claims**




1. A message billing arrangement for a private branch exchange having a plurality of stations and central office trunks equipped to receive message billing signals from a remote central office comprising

storage means having a memory word for each of said stations and a memory word for each of said trunks,

means for entering into one of said trunk memory words the number of one of said stations using one of said trunks on a central office call,

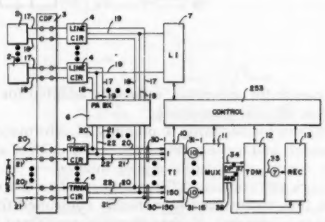
means for periodically scanning said trunks to detect when said one of said trunks receives one of said message billing signals, and

means responsive to said scanning means detecting one of said signals for transferring to the one of said station memory words identified by the contents of said one of said trunk words an accruable count indication.

## 3,920,913
## RINGBACK TONE APPARATUS AND TELEPHONE METERING SYSTEM

**Clare G. Keeney, Campbell, Calif., assignor to TRW Inc., Los Angeles, Calif.**

**Filed Jan. 31, 1974, Ser. No. 438,418**
**Int. Cl.[2] H04M** *15/38*
**U.S. Cl. 179—8 A** **16 Claims**



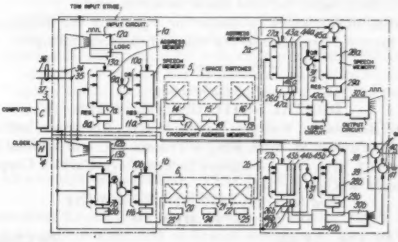

1. a message metering apparatus for operation with a telephone system having local stations and trunk lines, having a switching exchange for connecting the stations to the trunk lines, and having tone signals of predetermined duration for signaling in the telephone system, said apparatus comprising, analog-to-digital converter means for converting said tone signals to rectangular wave signals having pulse widths representing the duration of said tone signals,

first detector means including lower limit first means for sensing pulse widths of said rectangular wave signals less than a first lower limit, upper limit first means for sensing pulse widths of said rectangular wave signals greater than a first upper limit, and means, responsive to both said first means for sensing, for indicating when tone signals have a pulse duration between said first lower limit and said first upper limit.

## 3,920,914
## DIVIDED TIME-DIVISION SWITCHING NETWORK

**Albert Regnier, Issy-les-Moulineaux; Bernard Jean Jacques Canceill, Paris; Kevork Kevorkian, St. Germain-en-Laye, and Jean Paul Lager, La Celle St. Cloud, all of France, assignors to International Standard Electric Corporation, New York, N.Y.**

**Filed Apr. 11, 1973, Ser. No. 350,053**
**Claims priority, application France, Apr. 11, 1972, 72.12633**
**Int. Cl. H04j** *3/00*
**U.S. Cl. 179—15 AT** **9 Claims**




1. A time-division switching network arranged in a time-space-time configuration wherein the network is divided in at least one of its parts into at least two, identical, parallel sub-networks for processing on a load sharing basis all the communications transmitted through time-division channels connected to the network, said network including a control system comprising:

first means for reserving a first path for each communication in either of the two sub-networks,

second means for reserving a second path for each communication in another sub-network in addition to the first path reserved for that communication in the first sub-network, and

third means for selectively authorizing the transit of a communication through either of the two paths reserved to that communication, when two paths coexist.

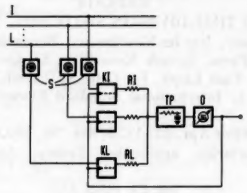
## 3,920,915
## CIRCUIT ARRANGEMENT FOR MUTUAL SYNCHRONIZATION OF THE CLOCK OSCILLATORS PROVIDED IN THE CENTRAL OFFICES OF A PCM TIME-DIVISION MULTIPLEX TELECOMMUNICATION NETWORK

**Max Schlichte, Munich, Germany, assignor to Siemens Aktiengesellschaft, Berlin and Munich, Germany**

**Filed Sept. 20, 1973, Ser. No. 399,269**
**Claims priority, application Germany, Sept. 28, 1973, 2247666**
**Int. Cl.[2] H04J** *3/06*
**U.S. Cl. 179—15 BS** **3 Claims**

1. Apparatus for mutual synchronization of clock oscillators provided in nodes of a time division multiplex telecommunication network, the nodes of said network being interconnected by a plurality of time multiplex transmission lines comprising: clock oscillator means in each said network node constructed to produce pulse trains having pulse spacings smaller than expected variations in the propogation time of said transmission lines,

at least one phase discriminator means assigned to each incoming line to a said network node, said phase discriminator means having an input connected to an output of said clock oscillator in said network node and an input connected to said incoming line for receiving pulse trains having pulse spacings smaller than expected variations in the propogation time of said transmission lines,




summing means connected to receive outputs from said phase discriminator means and for producing a frequency control signal for said clock oscillator, and

means in said clock oscillator for regulating the frequency thereof responsive to the value of said control signal.

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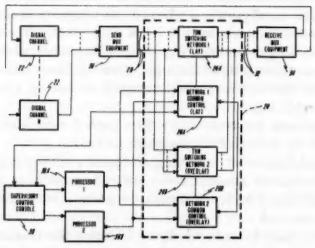
## 3,920,916
## DIGITAL SWITCHING NETWORK

**Barrie Brightman, Webster; George Datsko, Rochester, both of N.Y.; Edward W. Moll, King of Prussia, Pa., and William H. Stewart, Scio, N.Y., assignors to Stromberg-Carlson Corporation, Rochester, N.Y.**

**Filed Sept. 27, 1973, Ser. No. 401,534**
**Int. Cl.[2] H04Q *11/04***
**U.S. Cl. 179—15 AL** **28 Claims**



1. A switching network for transmitting send time divided multiplex digital signals from any of a plurality of send circuits, sampled in accordance with recurring send line time slots assigned thereto, to any of a plurality of receive circuits on a time divided multiplex basis in accordance with recurring receive line time slots assigned thereto, said switching network comprising:

a plurality of interconnect highways;

send memory circuit means for receiving and storing the send time divided multiplex digital signals from the send circuits at assigned send line time slots and for transmitting the stored send time divided multiplex digital signals on any of said plurality of interconnect highways on a time divided multiplex basis at any of a plurality of recurring switching time slots, said send memory circuit means including send random access memory circuit means, circuit means for writing the received send time divided multiplex signals into the send random access memory circuit means and circuit means for transmitting the stored send time divided multiplex signals from the random access memory circuit means to said interconnect highways;

receive memory circuit means for receiving and storing the send time divided multiplex digital signals transmitted on any of said plurality of interconnect highways at any of said plurality of switching time slots and for transmitting the stored send time divided multiplex digital signals to receive circuits at assigned receive line time slots, said receive memory circuit means including, a receive random access memory circuit means, circuit means for writing the send time divided multiplex signals received from said interconnect highways into said receive random access memory circuit means, and circuit means for transmitting the stored send time divided multiplex signals from said random access memory circuit means to the receive circuits, and

control circuit means for controlling the send and receive memory circuit means to direct the transfer of the send time divided multiplex digital signals between designated send and receive circuits by selecting the recurring switching time slots and interconnecting highways by which said digital signals are transferred, said control circuit means operating in response to commands from a processor connected thereto designating the send and receive circuits between which transmission is to take place.

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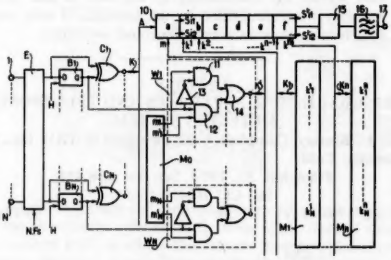
## 3,920,917
## MODULATOR WITH NUMERICAL OPERATION FOR VOICE-FREQUENCY TELEGRAPHY AND SIMILAR SIGNALS

**Marie-Annick Roy, Antony, France, assignor to Compagnie Industrielle des Telecommuncations Cit-Alcatel, France**

**Filed Feb. 27, 1974, Ser. No. 446,340**
**Claims priority, application France, Dec. 19, 1973, 73.45573; Feb. 27, 1973, 73.06950**
**Int. Cl.[2] H04J *3/00***
**U.S. Cl. 179—15 A** **10 Claims**



1. A modulator apparatus, especially adapted for use with telegraphic signals, comprising:

first means for receiving a plurality of information signal channels and for sequentially scanning each of said channels over a prescribed sampling interval;

a numerically controlled filter connected to the output of said first means, said numerically controlled filter comprising a plurality of filter sections connected in series, the first one of which receives the output of said first means; and

second means, coupled to said filter and synchronized with the scan effected by said first means, for supplying to said filter a plurality of filter coefficient signals corresponding to those channels sampled by the scan of said first means in accordance with the order of each respective one of said channels during said scan, said second means including a plurality of memories for storing said coefficients to be supplied to said plurality of filter sections.

## 3,920,918

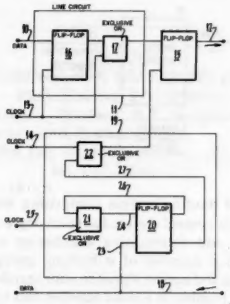
### PULSE EDGE COINCIDENCE DETECTION CIRCUIT FOR DIGITAL DATA TRANSMISSION USING DIPHASE DATA SYNC

**James Houghton Thomas, Bundoora, Australia, assignor to L.M. Ericsson Pty Lid., Broadmeadows, Australia**

**Filed June 6, 1974, Ser. No. 477,097**

**Int. Cl.[2] H04L** *7/00*

**U.S. Cl. 179—15 BS** **8 Claims**



1. A transition coincidence detection and compensation circuit for a synchronous digital data transmission system wherein data is transmitted and received between a central system device and a remote terminal, said circuit comprising a circuit connected to detect transition coincidence between data received by the central device from the remote terminal and a local system clock and circuit means responsive to said circuit to delay said outgoing data from said device, upon which outgoing data the timing of said received data is dependent.

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## 3,920,919

### DEVICE FOR CHECKING A MULTIPLEX DIGITAL TRAIN

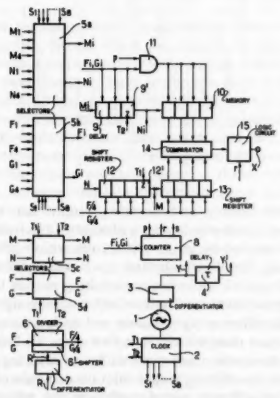
**Claude Aillet, Lannion, France, assignor to Compagnie Industrielle des Telecommunications Cit-Alcatel, France**

**Filed July 2, 1974, Ser. No. 485,261**

**Claims priority, application France, July 3, 1973, 73.24429**

**Int. Cl.[2] H04J** *3/06*

**U.S. Cl. 179—15 BS** **12 Claims**



1. A device for checking the correspondence between a rapid multiplex digital train and digital non-synchronized rhythm trains about $k$ times slower, said device comprising:

memory means for storing a first word of a predetermined number of bits $q$, said first word sampled on one of $k$ slow input trains M$i$ having a rhythm F$i$ of a multiplexer and $k$ slow output trains N$i$ having a rhythm G$i$ of a demultiplexer;

divider means for dividing by $k$ a rapid rhythm F of a rapid output train M of said multiplexer and a rapid rhythm G of a rapid input train N of said demultiplexer;

first register means for providing a second word of said predetermined number of bits $q$, said second word being sampled on said rapid train at said rapid rhythm;

comparison means for comparing said first and second words for coincidence during a predetermined selection time;

timing control means for controlling the timing of said rapid rhythm divided by $k$ as a function of a lack of coincidence in said comparison means to achieve coincidence, said timing control means providing a timing regulation mode;

error checking means for detecting errors in said coincidence of said first and second words during said predetermined selection time, said error checking means providing an error checking mode; and

alarm indicating means for indicating an alarm signal representative of at least one of said error in said coincidence and a failure to achieve a coincidence during said predetermined selection time.

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## 3,920,920

### DATA INSERTION IN THE SPEECH MEMORY OF A TIME DIVISION SWITCHING SYSTEM

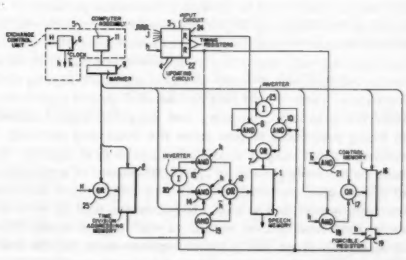
**Jean-Paul Lager, La-Celle-St-Cloud, and Didier Refol, Boulogne-Billancourt, both of France, assignors to International Standard Electric Corporation, New York, N.Y.**

**Filed Sept. 16, 1974, Ser. No. 506,420**

**Claims priority, application France, Sept. 18, 1973, 73.33395**

**Int. Cl.[2] H04J** *3/12*

**U.S. Cl. 179—15 BY** **5 Claims**



1. A system for inserting control data into the speech memory of a time-division switch comprising

a speech memory,

a switching network control unit,

store means enabling the association of an individual memory element of the store means with each row in the speech memory,

write addressing means coupled responsive to the condition of the memory element of the store means associated with a speech memory row to authorize the addressing of that memory row when the associated element is in a first condition and to substitute the selected addressing of another row for the addressing of that row when the associated memory element is in a second condition,

speech memory write control means responsive to the condition of the memory element associated with a speech memory row to authorize insertion of the expected speech sample into that row when the memory element

associated with that row is in a first condition and to substitute data for the expected sample when the memory element associated with that row is in a second condition.

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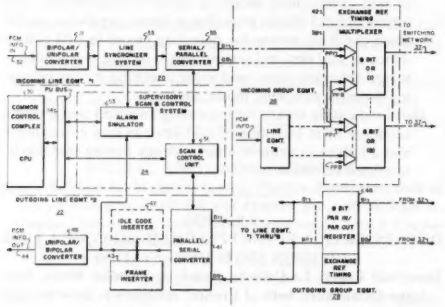
## 3,920,921
## LINE EQUIPMENT FOR SCAN AND CONTROL SYSTEM FOR SYNCHRONIZED PCM DIGITAL SWITCHING EXCHANGE

**Satyan G. Pitroda, Villa Park, and Michael J. Kelly, Melrose Park, both of Ill., assignors to GTE Automatic Electric Laboratories Incorporated, Northlake, Ill.**

**Filed Dec. 13, 1974, Ser. No. 532,540**
**Int. Cl.[2] H04J 3/12**
**U.S. Cl. 179—15 BF** **16 Claims**

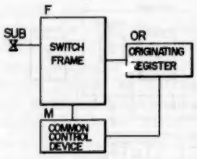


**1.** In a digital telecommunication switching system having incoming and outgoing digital information processed through a PCM switching network under the operation of a common control complex including a call processor unit, a supervisory scan and control system comprising first and second register store means connected to receive preselected portions of said incoming and outgoing digital information, respectively, said first and second register store means providing first and second output signals, respectively, upon each occurrence of said preselected portions of received incoming and outgoing digital information, each of said first and second output signals being re-inserted into said incoming and outgoing digital information being processed to and from the switching network, respectively, third output signals from said first register store means collectively providing the digital states of a plurality of said preselected portions of incoming information and being selectively connected to said call processor unit for providing thereto first read access means of said digital states, fourth output signals from said second register store means collectively providing the digital states of a corresponding plurality of said preselected portions of outgoing information and being selectively connected to said call processor unit for providing thereto second read access means of said digital states, third and fourth register store means connected to said call processor unit and being selectively enabled thereby to provide fifth and sixth output signals, respectively, at least corresponding to a change in digital state of predetermined ones of said preselected portions of incoming information, said fifth and sixth output signals being effective to inhibit further changes of digital state for said predetermined ones of said preselected portions of incoming information and for predetermined ones of said preselected portions of outgoing information, respectively, logic means selectively connecting said third, fourth, fifth and sixth output signals to said call processor unit, and address decoder means connecting said call processor unit to said logic means and providing logic command signals to selectively enable said connection of the third, fourth, fifth and sixth output signals to the call processor unit.

## 3,920,922
## TERMINAL HUNTING SYSTEM IN AN AUTOMATIC TELEPHONE SWITCHBOARD

**Shogo Nishigori, Kanagawa, and Kenzi Mochizuki, Yokohama, both of Japan, assignors to Hitachi, Ltd., Japan**

**Filed Aug. 8, 1973, Ser. No. 386,550**
**Claims priority, application Japan, Aug. 11, 1972, 47-79934**
**Int. Cl. H04q 3/10**
**U.S. Cl. 179—18 HA** **8 Claims**




**1.** A terminal hunting system comprising means provided within a common control device for receiving a called number from a register and determining whether or not said called number is a pilot number of a hunting group, said means applying a group indication signal to said register in the event that said called number is a pilot number and busy, said common control device being reset upon receipt of said group indication signal, and means provided within said register for transferring from said called number to another number in said hunting group and actuating said common control device again in the event that said called number is a pilot number, said transfer and actuation of said common control device being repeated until an idle line is found in the group thereby to complete the connection to a called subscriber.

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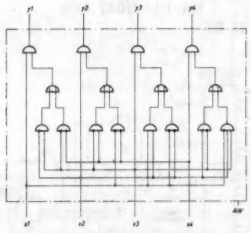
## 3,920,923
## PATH FINDING AND MARKING CIRCUIT

**Hilmar Schönemeyer, Hemmingen, Germany, assignor to International Standard Electric Corporation, New York, N.Y.**

**Filed Jan. 28, 1974, Ser. No. 437,049**
**Claims priority, application Germany, Feb. 2, 1973, 2305227**
**Int. Cl.[2] H04Q 3/52**
**U.S. Cl. 179—18 GF** **8 Claims**



**1.** A path-finding and marking circuit for a multi-stage switching network employing a plurality of switching matrices and links coupled by guide wires over which offering signals and catching signals are applied, each stage of the multi-stage switching network including a switching matrix together with offering signal inlets and outlets and catching signal inlets and outlets, said offering signal inlets and outlets providing access to path means over which, in a first step, all links usable for a desired connection are marked by an offering signal transmitted from an offering signal inlet on one side of a switching matrix to an offering signal outlet on the other side of the switching matrix, and on which, in a second step, one out of several offered links is marked as "selected" by a catching

signal sent back from a catching signal inlet on the other side of said switching matrix to a catching signal outlet on said one side of the switching matrix over path means provided through said catching signal inlets and outlets, wherein the improvement comprises a plurality of logic means in each stage coupling respective inlets and outlets to each other and to inlets of the switching matrix, said logic means including a selection circuit coupled to each matrix, said logic means responding to the simultaneous presence of offering and catching signals whereby said selection circuit marks crosspoints in the switching matrix.

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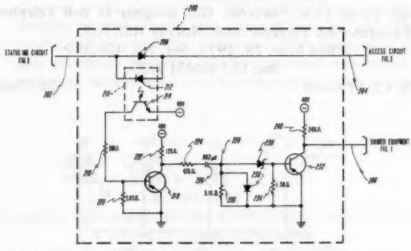
## 3,920,924
## CONTROL CIRCUIT FOR SHARED TELEPHONE CALL PROCESSING EQUIPMENT

**Robert L. Layburn, Pittsford, N.Y., assignor to Stromberg-Carlson Corporation, Rochester, N.Y.**

**Filed July 10, 1974, Ser. No. 487,087**
**Int. Cl.[2] H04Q** *1/18*
**U.S. Cl. 179—18 AB** **3 Claims**



1. In a telephone system including a status indication circuit for indicating the busy-idle condition of shared call processing equipment, which normally is switched between a first state when busy and a second state wnen idle, to an access circuit attempting to complete a connection to the shared equipment, the access circuit having switching means responsive only to a voltage level which is greater than a predetermined voltage level to complete the connection, the status indication circuit including:

first circuit means normally presenting a first voltage level to the access circuit when the shared equipment is idle and a second voltage level to the access circuit when the shared equipment is busy, only the first voltage level being greater than the predetermined voltage level;

second conduit means responsive to substantially simultaneous attempts by more than one access circuit to complete connections to the shared equipment to override the first circuit means and to present a third voltage level, which is substantially less than the second voltage level, to the access circuits;

the improvement comprising a control circuit having:

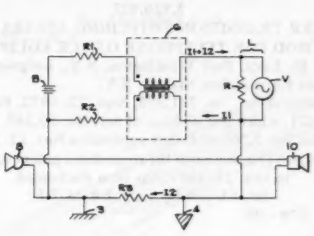
an input circuit connected to the status indication circuit and to the access circuit, the input circuit including circuit means responsive to the first voltage level presented by the status indication circuit and to an attempt by the access circuit to complete a connection to the shared equipment to generate a signal, and

an output circuit which includes electrical switching means responsive to the signal generated by the input circuit for transmitting to the shared equipment an output signal for switching the shared equipment to one of the busy and idle conditions.

## 3,920,925
## GROUND ISOLATING CIRCUIT

**Carl E. Lindow, San Jose, Calif., assignor to FMC Corporation, San Jose, Calif.**

**Filed June 18, 1973, Ser. No. 370,885**
**Int. Cl.[2] H04B** *3/28*
**U.S. Cl. 179—78 R** **10 Claims**



1. In a circuit comprising:

a D.C. power supply having two power leads;

a load having a resistive component connected to the D.C. power supply by the power leads;

means in said circuit for generating a pulsating current component; and

means providing a secondary current path connecting the D.C. power supply with the resistive load;

the improvement comprising a transformer having a pair of windings and having very good inductive coupling between its windings, each of said windings being connected in series between a corresponding one of said power leads of the D.C. power supply and the load, whereby the pulsating current component in the secondary current path is reduced by equalizing the pulsating current components in the power leads.

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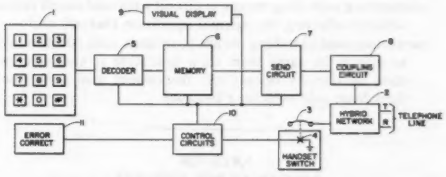
## 3,920,926
## TELEPHONE DATA SET INCLUDING VISUAL DISPLAY MEANS

**George Victor Lenaerts, and Eric Egils Auzins, both of London, Canada, assignors to Northern Electric Company Limited, Montreal, Canada**

**Filed Dec. 7, 1973, Ser. No. 422,816**
**Int. Cl.[2] H04M** *1/44*
**U.S. Cl. 179—90 B** **6 Claims**




1. A telephone data set comprising:

a conventional telephone set having a pushbutton pad, a handset, and circuit means for connecting the set to a telephone line;

memory means for storing binary signals corresponding to the signals from the pushbutton pad;

a send circuit connected to said memory means for generating telephone signalling signals corresponding to the contents of the memory means;

an error correct key;

a logic control circuit for allowing the memory means to store a plurality of signals generated by the pushbutton pad, said control circuit being responsive to the signal from one of the keys on the pushbutton pad for causing the signals stored in the memory means to be fed sequen-

tially to the send circuit and hence unto the telephone line; said logic control circuit including error circuit means responsive to a first momentary actuation of the error key to erase from the memory means the data corresponding to the last-entered digit.

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3,920,927

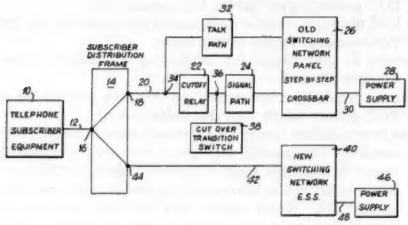
**CUTOVER TRANSITION SWITCHING APPARATUS AND METHOD FOR TELEPHONE OFFICE EQUIPMENT**

**Paul V. De Luca, Port Washington, N.Y., assignor to Porta Systems Corporation, Syosset, N.Y.**

**Division of Ser. No. 291,355, Sept. 22, 1972, Pat. No. 3,772,621, which is a division of Ser. No. 50,248, June 26, 1970, Pat. No. 3,700,824. This application Nov. 12, 1973, Ser. No. 414,948The portion of the term of this patent subsequent to Oct. 24, 1989, has been disclaimed.**

**Int. Cl.[2] H04Q *1/18*; H04M *7/12***

**U.S. Cl. 179—98** **21 Claims**




1. In a telephone office the method of effecting disconnection of subscriber lines between a subscriber distribution frame and a switching network of the panel, crossbar or step-by-step type having a plurality of cutoff relays operatively associated therewith connected between said subscriber distribution frame and said switching network with the number of cutoff relays having a predetermined relationship with the number of telephone subscriber lines, wherein said cutoff relays having first and second states are in their first states and comprising the steps of

connecting switching means in circuit with said cutoff relays without affecting the normal operation thereof, and

activating said switching means to operate said cutoff relays to switch the same from their first state to their second state to thereby operatively disconnect said subscriber lines from said switching network.

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3,920,928

**LINE CONTROL CIRCUIT**

**Stephen Walter Lye, Oaklandon, Ind., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.**

**Filed Mar. 29, 1974, Ser. No. 456,372**

**Int. Cl.[2] H04M *1/00***

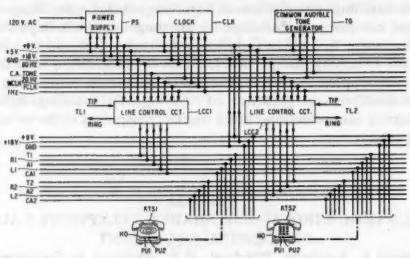
**U.S. Cl. 179—99** **22 Claims**

1. A line control circuit for use in a telephone system comprising the line control circuit, and a telephone line and at least one telephone set associated with the line control circuit, the system having a plurality of operational modes, the line circuit comprising

a counter activatable to a plurality of selected states, each of which corresponds to an operational mode of the system;

means responsive to the occurrence of a condition associated with a particular mode for activating the counter to advance toward a corresponding selected state; and

means responsive to the advancement of the counter to said




selected state for placing the system in a corresponding mode.

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3,920,929

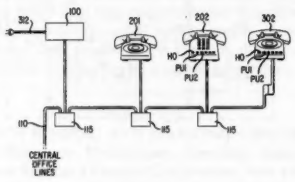
**KEY TELEPHONE SYSTEM**

**Louis David Tate, Norcross, Ga., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.**

**Filed Mar. 29, 1974, Ser. No. 456,390**

**Int. Cl.[2] H04M *1/00***

**U.S. Cl. 179—99** **20 Claims**




1. A telephone line control circuit for use in a telephone system comprising a telephone line, the line control circuit, and at least one telephone set associated with the telephone line, the system having a plurality of operational modes, the line circuit comprising:

counter means activatable to a plurality of states, one of which corresponds to particular operational mode of the system;

means responsive to the occurrence of a condition associated with the particular operational mode for activating the counter means to advance toward the corresponding state; and

means responsive to the advancement of the counter means to the corresponding state for placing the system in the particular mode.

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3,920,930

**FIELD EFFECT RECORDINGS AND SEMICONDUCTOR PLAYBACK DEVICES**

**John James Sobczyk, 68 Fairview Plaza, Los Gatos, Calif. 95030**

**Filed Apr. 8, 1974, Ser. No. 458,706**

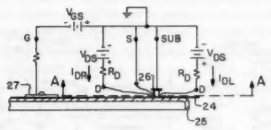
**Int. Cl.[2] H04R *23/00***

**U.S. Cl. 179—100.41 T** **18 Claims**

1. A semiconductor field effect transducer device comprising in combination:

a. a stylus of doped semiconductor material of one conductivity type having doped source and drain areas of opposite conductivity type separated by and connected to a conducting channel; and source and drain electrodes connected to said doped source and drain areas;

b. a power source connected to said source electrode for selectively causing a preselected current flow through said conducting channel;
c. an insulating layer constituting a gate electrode lying adjacent to said source, drain, and channel areas;
d. means for connecting a power source to said source electrode and said gate electrode; and




e. an output circuit connected to said drain electrode;
f. selected portions of said source, drain, and conducting channel areas arranged so that current flow through a portion of said conducting channel area is field effect modulated by variations in electric fields induced in said gate electrode by virtue of the transverse movement of said gate electrode relative to said semiconductor stylus

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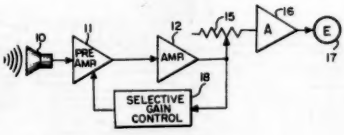
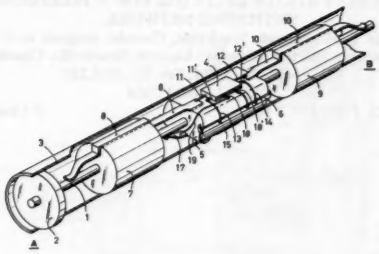
**3,920,931**
**HEARING AID AMPLIFIERS EMPLOYING SELECTIVE GAIN CONTROL CIRCUITS**
**Paul Yanick, Jr., 1904 Oak Tree Road, Edison, N.J. 08817**
**Filed Sept. 25, 1974, Ser. No. 508,998**
**Int. Cl.[2] H04R** *25/00*
**U.S. Cl. 179—107 FD** **10 Claims**




1. A hearing aid device comprising:
a. transducer means for providing electrical signals corresponding to received audio signals,
b. gain controllable amplifier means coupled to said transducer means and operative to provide a relatively constant gain over a desired audio frequency, and
c. means for varying the gain of said amplifier when the intensity of said audio signal exceeds a predetermined sound intensity level in the vicinity of forty decibels; whereby the gain of said controllable amplifiers remains constant for all intensity levels below said vicinity and is decreased for all intensity levels above said vicinity of forty decibels; said means for varying the gain including first and second detecting means, said first means responsive to the peak value of certain of said audio signals in excess of said level and said second means responsive to the average value of all audio signals in excess of said intensity level for varying the gain of said amplifier according to such both said first and second means.

**3,920,932**
**COAXIAL CABLE INCLUDING LINE REPEATERS FOR BROADBAND SIGNALS**
**Engel Roza, Emmasingel, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.**
**Filed Aug. 20, 1974, Ser. No. 499,065**
**Claims priority, application Netherlands, Aug. 25, 1973, 7311734**
**Int. Cl.[2] H04B** *3/36*
**U.S. Cl. 179—170 R** **7 Claims**



1. A coaxial cable comprising: an inner conductor and an outer conductor; at least one line repeater having a pair of input and output terminals, said repeater being located in a cable section between said inner and outer conductor; a tubular ferromagnetic element coaxially mounted on and electromagnetically coupled to said inner conductor in front of said line repeater to provide, without a mechanical interruption of the inner conductor, an anterior electrical interruption for a broad frequency band of signals transmitted through the cable; and first means to couple the signal occuring in a cable section before said anterior electrical interruption to the input terminals of said line repeater, whereby the output terminals are coupled to a cable section behind said electrical interruption.

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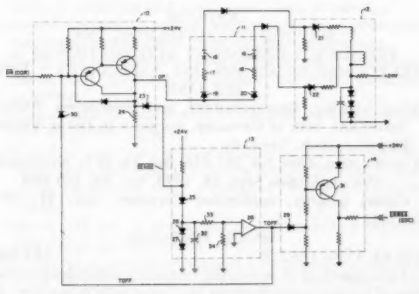
**3,920,933**
**STATUS DETECTOR FAULT DETECTOR**
**Thomas J. Moorehead, Brockville, Canada, assignor to GTE Automatic Electric (Canada) Limited, Brockville, Canada**
**Filed Sept. 27, 1974, Ser. No. 510,110**
**Int. Cl.[2] H04M** *3/24*
**U.S. Cl. 179—175.2 C** **3 Claims**



1. A fault detection system for a status detector of a communication switching system, said status detector including a detector driver signal, a status detector driver, a status detector control, peripheral unit sense points, and a status detector receiver, said fault detection system comprising:
negative potential detection means coupled to said status detector driver for producing a signal to turn off said

status detector driver when a negative potential is detected;

error signal generating means coupled to said negative potential detector means; and

sense point protection means;

whereby when a negative potential occurs at said negative potential detection means said status detector driver is turned off and an error signal is produced.

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**3,920,934**

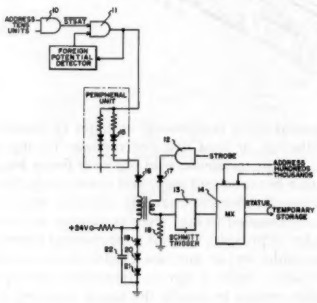
## IDLE/BUSY STATUS DETECTOR FOR A TELEPHONE SWITCHING NETWORK

**Thomas J. Moorehead, Brockville, Canada, assignor to GTE Automatic Electric (Canada) Limited, Brockville, Canada**

**Filed Sept. 27, 1974, Ser. No. 510,251**

**Int. Cl.² H04M *3/08***

**U.S. Cl. 179—175.2 R** **5 Claims**




1. A status detector for a communication switching system, said system comprising a data bus and a multiplicity of sense points, said status detector comprising:

status control means coupled to said data bus;

decoder means coupled to said status control means;

detector driver means coupled to said decoder means and to said sense points; and

receiver means coupled to said sense points and said status control means to determine the status of said sense points;

whereby the status of said sense points may be stored in said status control means from said receiver means.

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**3,920,935**

## METHOD FOR MEASURING THE FREQUENCY-DEPENDENT ATTENUATION OF A TELECOMMUNICATIONS LINE, ESPECIALLY A TWO-IRE LINE

**Oskar Vierling, Ebermannstadt, and Hansjürgen Wieland, Darmstadt, both of Germany, assignors to Oskar Vierling, Ebermannstadt, Germany**

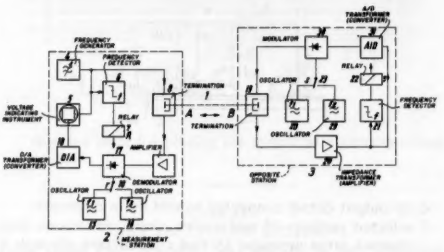
**Continuation of Ser. No. 207,858, Dec. 14, 1971, abandoned. This application Sept. 28, 1973, Ser. No. 401,693**

**Claims priority, application Germany, Dec. 21, 1970, 2062812**

**Int. Cl.² H04B *3/46***

**U.S. Cl. 179—175.3 R** **14 Claims**

1. In a method of measuring frequency-dependent attenuation of a telecommunications line, especially a two-wire line in both traffic directions, from one line end, in which method, frequency-dependent attentuation of the line in the direction from the opposite station to the measurement station is determined in a conventional manner at the measurement station at one line end through the corresponding switch-on of remote-controlled devices in the opposite station at the other end, the improvement comprising the steps of determining the frequency-dependent attenuation of a line in the direction from the measurement station to the opposite station (A–B) by transmitting measurement voltages having different respective frequencies from the measurement station to the opposite station, only one frequency being transmitted at any given time; converting the measurement voltages in the opposite station into further voltages; modulating with these further voltages at least one signal to vary a signal characteristic thereof, said at least one signal in each case always having a different frequency than the frequency of the measurement voltage currently transmitted from the measurement station




(A), said signal characteristic variation corresponding to the amplitude of the particular measurement voltage received at the opposite station, transmitting the at least one signal modulated by the further voltages via the line to be measured to the measurement station; and deriving from the at least one signal modulated by the further voltages as, received at the measurement station, signals corresponding to the amplitude of the measurement voltages as received at the opposite station, whereby the frequency transmissions characteristic of the line in both directions is determined for a wide band.

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**3,920,936**

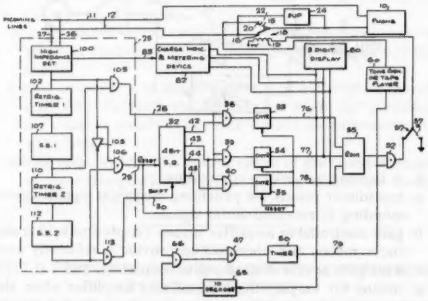
## TOLL-CALL RESTRICTION SYSTEM

**Charles S. Mogtader, 619 N. Camden Drive, Beverly Hills, Calif. 90210**

**Filed Feb. 4, 1974, Ser. No. 439,308**

**Int. Cl.² H04M *1/66***

**U.S. Cl. 179—18 DA** **19 Claims**




1. A toll call restriction system for use with telephone lines, comprising:

input means for coupling to said lines for successively sensing signals on said lines corresponding to the first $m$ dialed digits of the number of a telephone to be reached and for producing $m$ digit-representing signals;

first means coupled to said input means and including $m$ counter means arranged in a sequence from one to $m$ for storing numbers in the first through $m^{th}$ counter means, the numbers corresponding to the first through $m^{th}$ dialed digits as represented by said $m$ signals, said stored $m$

numbers in said counter means forming an *m*-number combination;

read only memory means coupled to said *m* counter means and responsive to the *m*-number combination therein for providing a first control signal only when said *m* -number combination does not correspond to any one in a plurality of *m*-number combinations defined in said read only memory means, each m-number combination of said plurality of combinations representing the exchange-identifying portion of a telephone number;

a timer coupled to said input means and enabled after said *m* numbers are stored in said *m* counter means for providing a second control signal for a preselected first period;

output means for disconnecting the dialed phone from said lines only when both said first and second control signals are supplied thereto; and

display means coupled to said m counter means for displaying the numbers stored therein.

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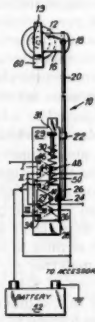
## 3,920,937
## MOTOR VEHICLE EQUIPMENT

**Jesse R. Hollins, 40 Stoner Ave., Great Neck, N.Y. 11021**

**Division of Ser. No. 318,377, Dec. 26, 1972. This application Feb. 25, 1974, Ser. No. 445,121. The portion of the term of this patent subsequent to Sept. 18, 1990, has been disclaimed.**

**Int. Cl.[2] H01H** *9/28*

**U.S. Cl. 200—44** **2 Claims**




1. Motor vehicle equipment comprising an ignition key receiving lock cylinder, a conducting arm, a conducting arm mover element, a switch first contact, a switch second contact, said conducting arm biased to touch said switch second contact, means for moving said conducting arm mover element so that said conducting arm is in circuit with said switch first contact when an ignition key is in said ignition key receiving lock cylinder, a light control switch for turning the lights of a vehicle "ON" and "OFF", a source of electrical power connected to said conducting arm mover element, means for automatically moving said light control switch to an "OFF" position for extinguishing the lights and electric circuit means coupled to the second contact whereby an electric current is supplied from said source of power through said second contact to said electric circuit means for activating said automatic moving means when the key is out of the key receiving lock cylinder.

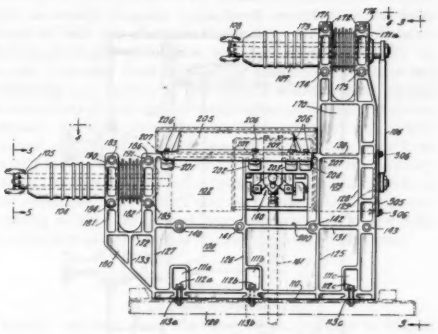
## 3,920,938
## HIGH VOLTAGE CIRCUIT BREAKER UNITARY POLE MOLDINGS

**Philip C. Netzel, Milmont Park; Thomas F. Brandt, Swarthmore, and Harold F. Strack, Alden, all of Pa., assignors to I-T-E Imperial Corporation, Spring House, Pa.**

**Filed Feb. 13, 1974, Ser. No. 442,208**

**Int. Cl.[2] H01H** *33/00*

**U.S. Cl. 200—50 AA** **7 Claims**



1. A high voltage circuit interrupter having circuit making and breaking contact structures, an operating mechanism for said contact structures and upper and lower connecting members to connect said first mentioned contact structures in a circuit; said upper and lower connecting members extending substantially parallel to each other but terminating at the operative connecting end thereof in different vertical planes; a pair of preformed molded support members; each molded member extending on each side of said circuit making and breaking contact structures and parallel to said upper and lower connecting members;

each preformed molded member constituting a unitary support structure having a base and a rigid vertical web extending upwardly from said base;

a first vertical extension from said web adjacent one end thereof suporting said upper connecting member;

a second extension from said web adjacent on opposite end thereof supporting said lower connecting member;

supports for said circuit making and breaking contact structures, said operating mechanism and said connecting members;

means on said vertical web and its extensions engaging said last mentioned supports;

said pair of preformed molded support members supporting said circuit making and breaking contact structure, operating mechanism and connecting members between them;

each of said pair of preformed molded members on each side being identical to the other;

the base of each molded support member having substantially horizontal flanges extending on each side of the vertical web;

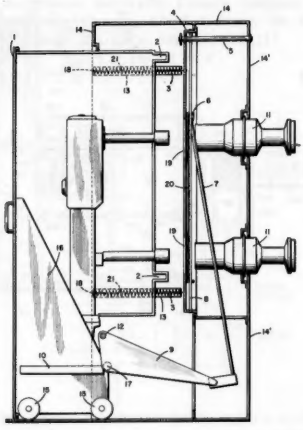
a plurality of horizontal slots in said flanges said slots each extending from an edge of a flange to beneath said vertical web; certain of said slots being open on one side of said web and others of said slots being open on the other side of said web;

and an opening in said web above each slot providing access to the top of the base at each slot.

## 3,920,939
## CIRCUIT BREAKER PROTECTIVE SHUTTER APPARATUS

Pietro Ciboldi, and Giulio Bellone, both of Bergamo, Italy, assignors to Magrini Galileo S.p.A., Milan, Italy

Filed Apr. 2, 1974, Ser. No. 457,265
Claims priority, application Italy, Apr. 6, 1973, 22652/73
Int. Cl.[2] H01H 9/22; H02B 1/14
U.S. Cl. 200—50 AA 8 Claims



1. A protective apparatus for electric board cubicle circuit breaker assemblies having a frame including at least rear and side walls defining a cubicle therebetween, means mounting high voltage line terminals on said rear wall such that said terminals extend at least partially into said cubicle, and a movable circuit breaker housing movable into and out of said cubicle and having contact members located thereon which mate with said line terminals when said housing is fully drawn into said cubicle, said protective apparatus comprising:

a protective shutter assembly, including a partition member located in said cubicle and having openings therein corresponding to the locations of said line terminals in said cubicle and a shutter member mounted on said partition member and horizontally movable therewith;

means mounting said shutter assembly in said cubicle for substantially horizontal movement toward and away from said rear wall between first and second positions, wherein, in said first position said shutter assembly is spaced from said rear wall a distance greater than the distance said line terminals extend into said cubicle from said rear wall, and wherein, in said second position said shutter assembly is located adjacent said rear wall such that said line terminals project through said openings in said partition member;

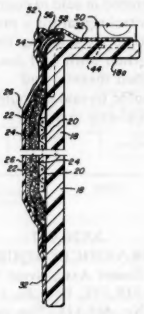
means for moving said shutter member substantially vertically between closed and open positions, wherein in said closed position, said shutter member covers said openings in said partition member to prevent access to said line terminals and in said open position, said shutter member uncovers said openings in said partition member to permit access to said line terminals; and

means provided on said movable housing for moving said shutter assembly between said first and second positions and for moving said shutter member between said closed and open positions.

## 3,920,940
## PRESSURE ACTUATED SWITCH AND METHOD FOR MAKING SAME

David F. Brown, Greeley, Colo., and Harold C. Urban, West Lake, Ohio, assignors to Colorado Time Systems, Inc., Loveland, Colo.

Filed July 24, 1974, Ser. No. 491,366
Int. Cl.[2] H01H 35/00
U.S. Cl. 200—52 R 20 Claims



1. A generally flat, pressure actuated switch comprising:

a. a rigid, flat base member,

b. a first flat screen member formed from an electrically conducting material and supported on one surface of said base member,

c. a second flat flexible screen member formed from an electrically conducting material,

d. a layer of resilient, porous material formed from a non-electrically conducting material, said porous material being disposed intermediate said screen members to maintain said screen members in a normally spaced apart relationship, said porous material being yieldably compressible when subjected to a force in a direction generally normal to a plane in which is disposed said porous material whereby, upon removal of said force, said porous material returns to its original configuration, the size of the openings formed in said porous material being sufficiently large to prevent complete closure thereof when said porous material is subjected to a force in a direction generally normal to the plane in which is disposed said porous material,

e. the mesh size of one of said screen members differing from the mesh size of the other screen member and the size of the openings formed in said layer of porous material varying between the mesh sizes of said screen members,

f. means for securing the edges of said screen members relative to the surface of said base member to permit thermal expansion of said base member relative to thermal expansion of said screen members without adversely changing the sensitivity of said pressure actuated switch,

g. a flexible layer of material cooperating with said base member for forming a chamber in which is disposed said screen members and said porous layer of material, said flexible layer of material being disposed against one surface of said second flexible screen member,

h. means for sealing said chamber to effect a fluid tight chamber,

i. a pair of electrical conductors each of which is attached to a respective one of said screen members, said electrical conductors being insulated one from the other and extending exteriorly of said chamber, and

j. means for effecting fluid communication between said chamber and exteriorly thereof for controlling the pressure within said chamber.

## 3,920,941

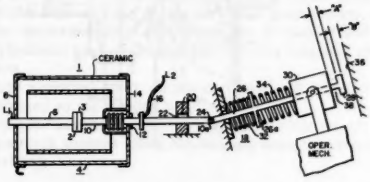
### CONTACT-OPERATING MECHANISM FOR BREAKING VACUUM INTERRUPTER CONTACT-WELDS BY BENDING ACTION OF THE MOVABLE CONTACT ROD

**Richard L. Hundstad, Pittsburgh, Pa., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.**

**Continuation-in-part of Ser. No. 279,566, Aug. 10, 1972. This application Sept. 28, 1972, Ser. No. 293,286**

**Int. Cl. H01h** *33/66*

**U.S. Cl. 200—144 B** **12 Claims**




1. A vacuum-type high-power circuit-interrupter of the type in which welding occurs between the contacts in the closed-circuit position thereof, comprising, in combination:

a. means defining an evacuated envelope;

b. cooperable separable contact means disposed interiorly of said evacuated envelope and including a movable contact and a stationary contact cooperable therewith in the closed-circuit position of the device;

c. an elongated movable contact stem (10) for actuating the movable contact (3) in its opening and closing motions away from said stationary contact;

d. contact-operating means for effecting a combined lateral bending stress-force exerted laterally upon the movable-contact operating stem in addition to a tensile axial opening retracting stress-force exerted upon said movable-contact operating stem; and,

e. said lateral bending stress-force being sufficient in magnitude in bending action that any welds existing between the closed contacts in the closed-circuit position of the device will be torn apart during the opening operation by such aforesaid adequate bending action.

## 3,920,942

### ARC-SHIELD ARRANGEMENT IN A VACUUM POWER CIRCUIT BREAKER

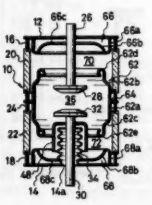
**Hifumi Yanagisawa, Tokyo, Japan, assignor to Kabushiki Kaisha Meidensha, Tokyo, Japan**

**Filed Apr. 3, 1974, Ser. No. 457,717**

**Claims priority, application Japan, Apr. 6, 1973, 48-41663**

**Int. Cl.² H01H** *33/66*

**U.S. Cl. 200—144 B** **6 Claims**



1. An arc-shield arrangement in a vacuum power circuit breaker which includes a vacuum-bulb power interrupter unit including a generally cylindrical insulating envelope and a pair of end plates connected to axial ends of said envelope through respective seal elements, a stationary electrode rod axially projecting into said envelope through one of said end plates, and a movable electrode rod axially projecting into said envelope through the other of said end plates and axially movable toward and away from said stationary electrode rod, said electrode rods extending substantially in line with each other and carrying electrical contact elements at their respective leading end portions for providing an arcing region between said contact elements when said movable electrode rod is axially moved away from said stationary electrode rod, the arrangement comprising a main arc-shield element having an axially central cylindrical portion which is in concentrically surrounding relationship to and radially spaced apart from said arcing region and axially outer end portions which extend axially outwardly from said central cylindrical portion and are respectively in concentrically surrounding relationship to said leading end portions of the electrode rods, and a pair of auxiliary arc-shield elements respectively mounted on the inner faces of said end plates, said auxiliary arc-shield elements having generally cylindrical portions projecting axially inwardly from said inner faces of the associated end plates and extending in proximity to and parallel with the inner peripheral surfaces of said seal elements adjacent to said end plates, annular portions extending radially inwardly and axially toward said inner faces of the associated end plates from axially inner ends of said cylindrical portions of the auxiliary arc-shield elements, the latter being axially spaced apart from the respective axial ends of said main arc-shield element, and forming an axial air gap between said axial ends of the main arc-shield element and said auxiliary arc-shield elements.

## 3,920,943

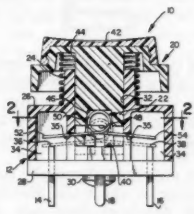
### ELECTRICAL SWITCH

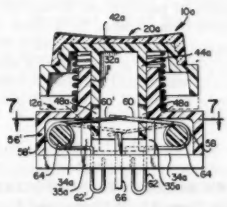
**Lloyd J. Lapointe, West Hartford, Conn., assignor to Magsat Corporation, West Hartford, Conn.**

**Filed Mar. 22, 1974, Ser. No. 453,723**

**Int. Cl.² H01H** *13/52, 1/26*

**U.S. Cl. 200—159 R** **27 Claims**





1. An electrical switch comprising a base member, an operating member supported by said base member for movement in one and an opposite direction between one and another switching position, contact spring means carried by one of the members and having two projecting free end portions, said contact spring means engaging said other member when said operating member is in its one switching position to maintain said operating member in assembly with said base member, means defining three spaced apart electrical terminals mounted in fixed position on said base member and having at leat two contact surfaces, said terminals being electrically isolated from each other when said operating member is in

said one switching position, each of said free end portions engaging one of said contact surfaces as said operating member is moved in said one direction from said one to said other switching position, said contact spring means electrically connecting said three terminals when said operating member is in said other switching position.

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**3,920,944**

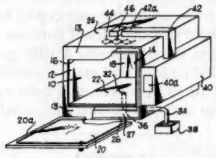
## METHOD OF COOKING FOOD EMPLOYING BOTH MICROWAVE AND HEAT ENERGY

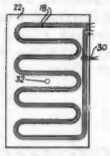
**Ronald Jack Walker Constable, Eythorne, near Dover, England, assignor to Hirst Microwave Industries Limited, Canterburg, England**

**Division of Ser. No. 172,860, Aug. 18, 1971, Pat. No. 3,716,687. This application Dec. 5, 1972, Ser. No. 307,702**

**Int. Cl.[2] H05B 9/06**

**U.S. Cl. 219—10.55 M** **7 Claims**





1. A method of cooking food which comprises:

preheating an electrically conductive member to a temperature at which said member is effective for cooking food; subjecting the food to microwave energy and at the same time applying heat to the food by way of the preheated electrically conductive member; and

maintaining the preheated electrically conductive member at a temperature at which said member is effective for cooking food during cooking, said member being in contact with the food so that the food is cooked by the combination of heat generated therein by the microwave energy and heat supplied thereto from the heated member, the depth of penetration of the microwave energy into said good being limited by a short circuit effect of said conductive member on said microwave energy, the electrically conductive member being preheated to said temperature at which said member is effective for cooking food by a source of energy independent from said microwave energy.

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**3,920,945**

## MICROWAVE FLUID HEATER

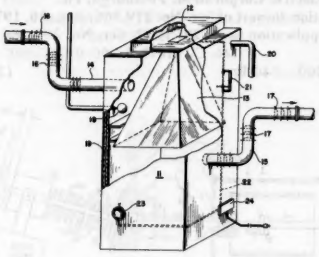
**Warren B. Smith; Harold L. Whitmer, and Hazel G. Whitmer, all of Clinton, Iowa, assignors to Harold L. Whitmer and Hazel G. Whitmer, both of Clinton, Iowa**

**Filed Apr. 24, 1974, Ser. No. 463,597**

**Int. Cl.[2] H05B 9/06**

**U.S. Cl. 219—10.55 R** **5 Claims**

1. A system for heating dielectric fluids, including bottom, top, and spaced side wall means defining a fluid receiving vessel, fluid inlet means communicating with one side wall means, fluid outlet means communicating with another side wall means, a source of microwave energy operatively associated with the top wall means, wave guide means of electrically conductive material extending downwardly from said top wall means and including diverging wall means having a substantial vertical extent in relation to the vertical extent of said vessel side wall means and terminating below the level of said fluid inlet means so as to direct said microwave energy directly into fluid within said vessel, another fluid outlet means communi-



cating with said vessel above the level of said fluid inlet means, control means responsive to temperature conditions within said vessel for controlling the source of microwave energy and means for regulating the flow of fluid into said vessel.

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**3,920,946**

## METHOD AND APPARATUS FOR AUTOMATIC WELDING OF STEEL PIPES

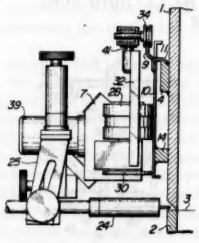
**Chiyomaru Takahashi; Tadao Kaneko, both of Chiba; Akira Sakabe, Urawa; Mitsuhiro Sakagami, and Kunio Arai, both of Funabashi, all of Japan, assignors to Hitachi, Ltd. and Kawasaki Steel Corporation, Japan**

**Filed Feb. 12, 1974, Ser. No. 441,898**

**Claims priority, application Japan, Feb. 21, 1973, 48-20162**

**Int. Cl. B23k 9/00**

**U.S. Cl. 219—60 A** **10 Claims**



1. A method for automatic welding at a welding zone defined by abutted ends of a pair of steel pipes held vertically one upon the other, end to end, by the use of a self-driven carriage equipped with magnetic rollers, drives for driving the rollers, and guide rollers having center axes substantially perpendicular to those of the magnetic rollers, comprising the steps of:

hooping the upper one of the pipes with a releasable support band composed of an annular guide rail and a cylindrical track suspended from the rail, and properly positioning the band relative to the welding zone by hooking the same on tabs secured beforehand to several points of the outer wall surface of the pipe which are at equal distances from the welding zone,

clamping the support band to keep it in contact with the normal wall surface of the pipe at several points spaced apart circumferentially of the pipe,

suspending the afore-mentioned carriage from the guide rail of the support band by means of the guide rollers, with the magnetic rollers of the carriage in contact with the cylindrical track of the suppport band by magnetic attraction,

setting a welding torch on the carriage, with its nozzle tip directed to the welding zone, and

driving the magnetic rollers so that the carriage travels with the torch thereon along the welding zone to accomplish welding.

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**3,920,947**

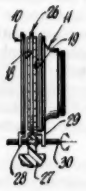
## TURBINE-NOZZLE MANUFACTURING APPARATUS AND METHOD

**Richard L. Wachtell, Tuxedo Park, and Edward C. Palmenberg, Nanuet, both of N.Y., assignors to Chromalloy American Corporation, Orangeburg, N.Y.**

**Continuation-in-part of Ser. No. 221,306, Jan. 27, 1972, Pat. No. 3,802,046. This application Jan. 24, 1974, Ser. No. 436,369**

**Int. Cl.[2] B23P** *1/08*

**U.S. Cl. 219—69 M** **9 Claims**




1. The method of boring opposed registering recesses in opposed inner faces of two spaced base members for later assembly to the ends of a connecting member at the respective bored recesses, which method comprises selecting an elongated boring-tool element of bore-characterizing section which corresponds to that of the desired connecting member, mounting the two base members with their inner faces opposed at a spacing which to a relatively small extent exceeds the length of said tool element, supporting said tool element with its elongation axis extending between said faces, subjecting said base members and tool element to an EDM environment wherein the tool element determines the section of bored removal of base-member material, and progressively feeding said base members with respect to each other and with respect to said tool element in the direction of boring coaction with the respective ends of said tool element and to the extent of tool boring both base members to predetermined depth.

**3,920,948**

## METHOD FOR REPAIRING INGOT STOOLS

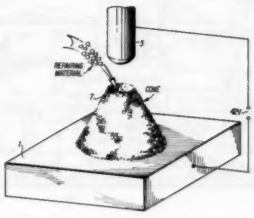
**Jan Schokkenbroek, Alkmaar, Netherlands, assignor to Hoogovens Ijmuiden BV, Ijmuiden, Netherlands**

**Filed Jan. 2, 1974, Ser. No. 429,809**

**Claims priority, application Netherlands, Jan. 9, 1973, 7300262**

**Int. Cl.[2] B23K** *9/04*

**U.S. Cl. 219—76** **9 Claims**




1. A method of repairing a heavy metal article comprising the sequential steps of:

electrothermally heating the portion of the article to be repaired by applying electrothermal power adjacent the portion of the article to be repaired in a reducing environment,

supplying metal to the portion of the article to be repaired, said metal being of a composition substantially that of the metal of the article to be repaired except for alloying components, flux, and covering substances,

electrothermally heating the metal supplied and the portion of the article to be repaired to render them molten for a substantial period of time by applying electrothermal power of at least 250 kVA adjacent the portion of the article to be repaired while maintaining the reducing environment for at least a substantial part of the time, and then

slowly cooling the article.

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**3,920,949**

## BEAM LEADED DEVICE WELDING MACHINE

**Arthur H. Clawson, Attica; Robert J. Ward, and Steven J. Butler, both of Frankfort, all of Ind., assignors to P. R. Mallory & Co. Inc., Indianapolis, Ind.**

**Filed Mar. 13, 1974, Ser. No. 450,563**

**Int. Cl.[2] B23K** *11/10;* **B21J** *13/10*

**U.S. Cl. 219—85** **9 Claims**

1. Apparatus for attaching elements to a substrate comprising:

a. a first heated platform receiving base members each having a multiplicity of said elements thereon,

b. means indexing said first platform in two directions substantially normal to each other,

c. a second heated platform receiving said substrate,

d. transfer means transferring at least one element from said first heated platform to said second heated platform comprising;

1. a sleeve,

2. a tool holder movable within said sleeve,

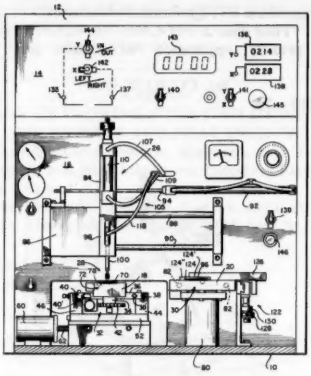
3. a heating rod carried by said holder,

4. a bore extending through a central axis of said heating rod,

5. a spring biased sleeve slideably carried in said bore, and

6. means applying a vacuum pressure to said bore and said spring biased sleeve, and

e. adjusting means carried by said second heated platform for adjusting the position of said element in relation to



said heating rod means so as to enable substantially equal pressure to be applied to said element.

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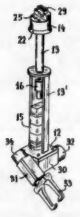
## 3,920,950
## WELDING MACHINE WITH A DISASSEMBLABLE COLUMN

**Luigi Caprioglio, Turin, Italy, assignor to Siv Deltix S.p.A., Turin, Italy**

**Filed Apr. 30, 1974, Ser. No. 465,684**
**Claims priority, application Italy, May 25, 1973, 68533/73**
**Int. Cl.² B23K** *9/28, 11/10*
**U.S. Cl. 219—88** **7 Claims**

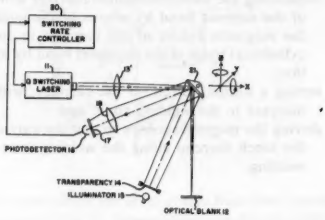


1. A welding machine comprising support means, movably supported on said support means, a column, said column having the form of a hollow shell, at a first end of said hollow shell a head, said head being rotatably mounted on said shell but not axially displaceable, and in said head first connection means, at the second end of said hollow shell a bearing, said bearing being rotatably mounted on said shell but not axially displaceable, and on said bearing first mechanical coupling means, a unit inserted into said hollow shell, at a first end of said unit second connection means that couple with said first connection means of said head, and at the second end of said unit a support plate for welding guns, said support plate having second mechanical coupling means that couple with said first mechanical coupling means of said bearing, said first and second connection means comprising mechanical, electrical and fluidical connection members, and at least one welding gun connected to said support plate, whereby upon insertion of said unit into said shell and coupling of said first and second mechanical coupling means, said first and second connection means are mutually engaged thus automatically establishing all necessary mechanical, electrical and fluidical connections between said column and said unit, as a consequence of the simple mechanical coupling of said column and unit.

## 3,920,951
## LASER ETCHING APPARATUS FOR FORMING PHOTOGRAPHIC IMAGES ON METALLIC SURFACES

**Joseph L. Chovan, and Albert J. Manoni, both of North Syracuse, N.Y., assignors to General Electric Company, Syracuse, N.Y.**

**Filed June 3, 1974, Ser. No. 475,419**
**Int. Cl.² B23K** *27/00*
**U.S. Cl. 219—121 L** **3 Claims**




1. Laser image forming apparatus comprising:
a. means for supporting an optical object thereon having light and dark resolution elements,
b. an optical detector electrically responsive to the brightness of small surface elements imaged thereon,
c. means for imaging single resolution elements of said optical object upon said optical detector to produce electrical signals indicative of the brightness of said elements,
d. an optical blank of a material suitable for laser etching,
e. an electrically controllable laser for producing a short duration optical pulse of high energy content and capable of a periodic control over an appreciable range of repetition intervals,
f. means for optically concentrating the energy in the beam of said laser on said blank to form a tiny pit in said blank for each laser pulse, said pits locally altering the reflectivity of said blank in respect to the unpitted surface,
g. means for scanning said detector over the image of said optical object simultaneously with scanning said pulsed laser beam over said optical blank at a uniform rate, said scanning means comprising:
   1. a mirror scanned through a solid angle, and wherein
   2. said optical object and said optical detector are arranged on a first pair of reciprocally reflective paths in respect to said mirror, and
   3. said optical blank and said pulsed laser are arranged on a second pair of reciprocally reflective paths in respect to said mirror, and
h. control means responsive to the output of said optical detector for causing the pulsing rate of said laser to vary as a function of object element brightness to create an optical image having light and dark resolution elements on said optical blank representing a similarity transformation of the density of said optical object.

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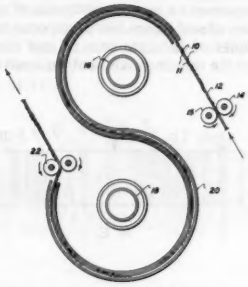
## 3,920,952
## DUPLEX FUSING APPARATUS AND METHOD

**Thomas L. Donnelly, and Edward J. Mullen, both of Webster, N.Y., assignors to Xerox Corporation, Stamford, Conn.**

**Filed Oct. 18, 1974, Ser. No. 516,058**
**Int. Cl.² H05B** *1/00*
**U.S. Cl. 219—216** **4 Claims**

1. An improved flash fusing apparatus for fusing toner images onto flexible support material comprising
a first elongated flash lamp,
a second elongated flash lamp positioned closely adjacent to said first lamp, and
means for advancing flexible support material bearing loose

toner images along a predetermined path substantially encircling each of said first and second flash lamps along



their longitudinal axes thereof to fuse the toner images thereto.

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## 3,920,953
## BUILDING PLATES WITH CONTROLLABLE HEAT INSULATION

**Nikolaus Laing, and Ingeborg Laing, both of Hofener Weg 35-37, 7141 Aldingen bei Stuttgart, Germany**

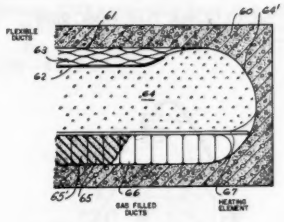
**Division of Ser. No. 830,457, June 4, 1969, Pat. No. 3,720,198. This application Feb. 26, 1973, Ser. No. 335,773**

**Claims priority, application Austria, Feb. 3, 1969, 1072/69; Feb. 3, 1969, 1068/69**

*Disclosure was also published under Trial Voluntary Protest Program on Jan. 28, 1975.*

**Int. Cl.² F24H** *7/00*

**U.S. Cl. 219—378** **5 Claims**



1. Building plate with controllable heat insulation means comprising a first wall adapted to face a zone of a first temperature, a second movable wall opposite said first wall and adapted to face a zone of a second temperature, a heat storage element comprising a latent heat storage substance bounding said second wall on its side facing the zone of second temperature, wall moving means for moving said second wall towards and away from said first wall to vary the transfer of heat between the walls, and resiliant means for urging said heat storage element towards said second wall.

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## 3,920,954
## ELECTRIC COFFEE MAKER WITH A THERMOSTAT AND HEAT SINK CONTROL

**William C. Dobson, and James W. Straughn, both of West Bend, Wis., assignors to Dart Industries Inc., Los Angeles, Calif.**

**Filed Apr. 28, 1975, Ser. No. 572,360**

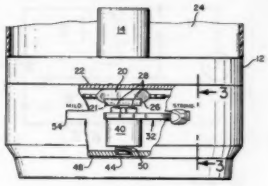
**Int. Cl.² F27D** *11/02*

**U.S. Cl. 219—441** **6 Claims**

1. In an electric coffee maker having a brew compartment mounted upon a base housing, said housing enclosing electrical parts with an electric heater located proximate the bottom of said compartment wherein the improvement comprises:

a thermostat located in heat conducting relation to the bottom of the brew compartment, said thermostat sensing the temperature of said bottom and deactivating the electric heater when said temperature reaches a predetermined level; and,

a rotatable lever having an end portion including a heat conductive section and a non-heat conductive section located in heat conducting relation to said thermostat,



said lever including a heat sink in heat conducting relation to said end portion whereby said heat sink being mounted for rotation and biased by spring means toward the thermostat, said heat conductive section operating to transmit heat to said heat sink from said thermostat when located directly adjacent said thermostat to thereby delay the deactivation of said electric heater and said non-heat conductive section operating to inhibit heat transfer from said thermostat to allow said thermostat to deactivate the electric heater without delay.

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## 3,920,955
## ELECTRONIC THERMALLY SENSITIVE SWITCH DEVICE

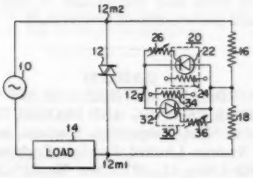
**Josuke Nakata, Itami, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan**

**Filed Sept. 16, 1974, Ser. No. 506,052**

**Claims priority, application Japan, Sept. 20, 1973, 48-106272; Sept. 26, 1973, 48-108113; Sept. 26, 1973, 48-108117; Nov. 15, 1973, 48-128848**

**Int. Cl.² H05B** *1/02*

**U.S. Cl. 219—501** **10 Claims**



1. An electronic thermally sensitive switch device comprising a bidirectional triode thyristor including a gate electrode and a main electrode to control a load, at least one thermally sensitive thyristor connected between said gate and main electrodes of said bidirectional triode thyristor and means for operating said thermally sensitive thyristor in response to heat to control said load.

## 3,920,956
## TEMPERATURE CONTROL APPARATUS

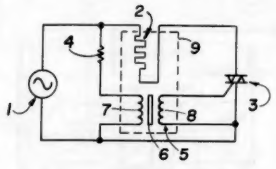
**Masanori Endo, and Ken Miyagi, both of Yokohama, Japan, assignors to Tohoku Metal Industries Limited, Sendai, Japan**

**Filed June 10, 1974, Ser. No. 478,093**

**Claims priority, application Japan, June 11, 1973, 48-67820[U]; June 11, 1973, 48-67821[U]; Oct. 11, 1973, 48-115742**

**Int. Cl.² H05B *1/02***

**U.S. Cl. 219—503** **14 Claims**




1. A temperature control apparatus comprising:
a source of AC electric power,
electric heater means excited by said AC electric power source,
a thyristor connected between said AC electric power source and said electric heater means for switching on or off the power supply to said electric heater means,
a resistor, and
a transformer thermo-coupled with said electric heater means, said transformer comprising:
a primary winding coupled to said AC electric power source through said resistor,
a secondary winding coupled to the control terminal of said thyristor, and
a core on which said windings are wound, said core having a Curie point of a predetermined temperature, and said core having a generally rectangular hysteresis loop with a less coercive force and a high differential permeability at the magnetic field strength equal to the coercive force, whereby when said core is at temperatures below said predetermined temperature an impulse signal is present on said secondary winding at each zero voltage point of the AC power signal and when said core is at a temperature at or above said predetermined temperature no output is present on said secondary winding,
said thyristor being turned on by the impulse present on said secondary winding when the temperature of said core is below said predetermined temperature to couple the AC electric power to said electric heater to energize said electric heater, said thyristor being maintained in its off condition when said temperature of said core is at or above said predetermined temperature.

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## 3,920,957
## DATE RECORDS AND METHOD AND APPARATUS FOR THEIR READING AND PRODUCTION

**George Edward Sims, Harpenden, England, assignor to S.B. Electronic Systems Limited, London, England**

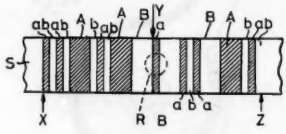
**Filed May 11, 1973, Ser. No. 359,269**

**Claims priority, application United Kingdom, May 12, 1972, 22270/72; May 26, 1972, 24917/72**

**Int. Cl.² G06K *7/10, 19/06;* H04L *15/24;* G06K *1/22***

**U.S. Cl. 235—61.11 R** **4 Claims**

1. A scanner for detecting a binary code formed of alternate code regions of contrasting kinds and of one of two widths, the code regions of one kind and of respectively narrow and wide widths being represented by *a* and A, and the code regions of the other kind and of respectively narrow and wide widths being represented by *b* and B, comprising in combination:
read head means for determining the kind and width of successive pairs of code regions; and
logic means connected to said read head means for producing one of the binary bits "one" and "zero" in response to the sequence *ab* in each said pairs of code regions, a pair of one of said binary bits in response to the sequence A*b*, a triplet of alternate ones of said binary bits in response to the sequence AB, and successively a disparate




pair of said binary bits and the complement thereof in response to successive sequences of *a*B;
said logic means comprising first gate means having separate inputs respectively indicative of conditions A, a, and B, second gate means connected to said first gate means, shift register means for successively enabling said second gate means, and a binary circuit for alternately enabling different ones of said first gate means in response to successive sequences of *a*B.

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## 3,920,958
## OPTICAL READER FOR PERFORATED CODE CARRIER TAPE

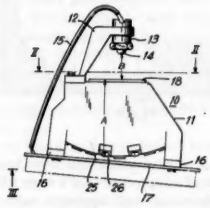
**Sven Gunnar Valter Stenudd, Lidingo, Sweden, assignor to Facit Aktiebolag, Atvidaberg, Sweden**

**Filed Apr. 1, 1974, Ser. No. 456,801**

**Claims priority, application Sweden, Apr. 2, 1973, 73045841**

**Int. Cl.² G06K *7/10;* G08C *9/06***

**U.S. Cl. 235—61.11 E** **9 Claims**

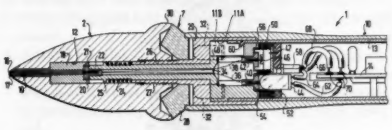



1. An optical reading device for a perforated code carrier tape comprising a housing, a high intensity light source located on one side of the tape, a plurality of photosensitive members positioned on the other side of the tape, said tape being movable with respect to said light source whereby light beams from the light source pass through the perforations in said code carrier tape when the latter is in the proper aligned position, a plurality of elongated channels in said housing, each of said channels being formed of two substantially identical parts in which each is provided with a longitudinal groove so that the elongated channels are formed by the opposed grooves upon the joining of said identical parts, and a photosensitive member at one end of each of said channels, the other end of each elongated channel being located in the proximity of at least one of the positions in which a perforation in the code carrier tape may assume upon movement of said tape.

## 3,920,959
## OPTO-ELECTRONIC SENSING ROD FOR THE MANUAL SCANNING OF GRAPHIC INFORMATION

**Norbert Wefers, Wilhelmshaven; Uwe Unglaube, and Joachim Schwarzkopf, both of Berlin, all of Germany, assignors to Nixdorf Computer AG, Paderborn, Germany**

**Filed Apr. 22, 1974, Ser. No. 463,040**
**Int. Cl.² G06K 7/10; G08C 9/06**
**U.S. Cl. 235—61.11 E** **8 Claims**



**1.** An opto-electronic sensing rod for the manual scanning of graphic information having a tip mounted in a sensing rod shaft and adapted to emit light and to receive light which is reflected from an information carrier, said tip being coupled through light conducting elements to a light source and a photo-electronic structural element, said opto-electronic sensing rod further having a plate bar which has a signal-preparing circuit mounted thereon, comprising the improvement wherein said tip, said light conducting elements and a carrier means for said light source and said photo-electronic structural element form a system which is movable relative to said plate bar through an application of a force onto said tip in said sensing rod shaft, resilient means for holding said system in a limiting position so that said tip projects from a front opening in said sensing rod shaft.

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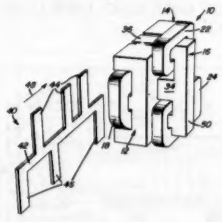
## 3,920,960
## SHIELDED MAGNETIC SENSING HEAD

**John L. Ditman, 4209 Ammendale Road, Beltsville, Md. 20705**

**Filed June 11, 1974, Ser. No. 478,305**
**Int. Cl. G06k 7/08, 9/02; G11b 5/27**
**U.S. Cl. 235—61.11 D** **17 Claims**

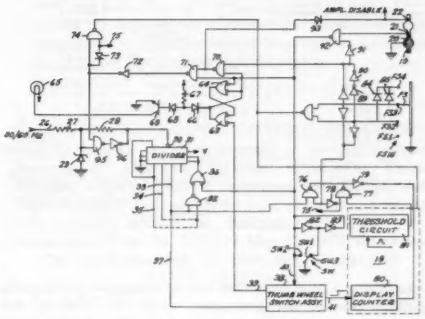


**1.** A shielded sensing head for reading coded information from at least one information train moving relative to the sensing head and developing magnetic flux at least when in association with the sensing head, the sensing head comprising: a sensing core of a magnetically conductive material, having at least one sensing arm terminating in a pole face for receiving magnetic flux; a sensing coil associating with each of said at least one sensing arm for reacting to magnetic flux flowing therethrough; and at least one shunt core of a magnetically conductive material having a number of shunt arms equal to the number of sensing arms, positioned adjacent such sensing arms so as to divert the magnetic flux developed by the information train from such sensing arms and through such shunt arms until substantial alignment occurs between select portions of said information train and select ones of said sensing arms.

## 3,920,961
## DIGITAL TIMER

**Robert H. Berg, 196 Clinton, Elmhurst, Ill. 60126**

**Continuation of Ser. No. 166,766, July 28, 1971, abandoned. This application Aug. 6, 1973, Ser. No. 386,219**
**Int. Cl.² G06M 11/00**
**U.S. Cl. 235—92 T** **6 Claims**




**1.** In an apparatus for monitoring the flow rate in a particle analysis system of the type including an orifice tube having an orifice and disposed in an electrolyte and connected in fluid communication with a vacuum source, a mercury manometer also connected to the vacuum source and having a pair of spaced start and stop electrodes to be sequentially engaged and disengaged by the mercury upon application and release of the vacuum, and means for sensing particle flow through the orifice and providing particle pulses in response thereto to particle counting and analyzing equipment, the improvement therein of means for performing a test run with a clean electrolyte and a clean orifice followed by at least one operational run with an electrolyte having particles suspended therein comprising:

clock means operable to produce clock pulses;

counting means responsive to the clock pulses including counting display means for displaying pulse counts;

means connecting said counting means to said clock means;

means for selectively connecting said display means to said clock means or the sensing means to display pulse count as time, or display the traversing of particles through the orifice, respectively;

control means connected between the start and stop electrodes and said clock means for controlling the production of clock pulses;

means for setting said counting means after a test run to a predetermined time count in accordance with the count displayed for the test run; and

alarm means connected to said counting means and operated during an operational run to indicate time counts greater than the predetermined time.

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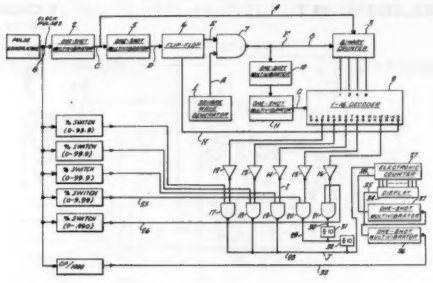
## 3,920,962
## PULSE SUMMING CIRCUIT

**Robert Mayer, Ardmore, Del., and Frank C. Pavlik, Clifton Heights, both of Pa., assignors to Sun Oil Company of Pennsylvania, Philadelphia, Pa.**

**Filed Mar. 25, 1974, Ser. No. 454,513**
**Int. Cl.² G06M 3/08**
**U.S. Cl. 235—92 ST** **16 Claims**

**1.** A circuit arrangement for totalizing the pulses selected by a plurality of selecting devices from the output of a common pulse generator in which each selecting device controls the percentage of a particular component being blended with other components in an automatic blending system and comprising a common pulse generator, a plurality of selecting devices coupled to said common pulse generator for controlling the percentages of particular components being blended, each of which selects and passes a percentage of the pulses

generated by said common pulse generator, a plurality of gates equal in number to the number of selecting devices, means connecting the selecting device outputs separately and individually to said gates, means for producing a train of gating



pulses having a high repetition rate as compared to the pulse repetition rate of said generator, means for applying said gating pulses sequentially to individual ones of said gates, thereby to sequentially open the same, and a common output circuit coupled to said gates.

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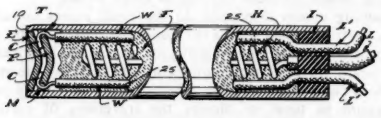
**3,920,963**

## RESISTANCE HEATER WITH IMPROVED THERMOCOUPLE

**Robert E. Beasley, Homeland, and Robert W. Hannah, Hemet, both of Calif., assignors to Rama Corporation, San Jacinto, Calif.**

**Filed Apr. 14, 1975, Ser. No. 567,593**
**Int. Cl.² H05B** *3/80, 1/02*
**U.S. Cl. 219—523** **8 Claims**



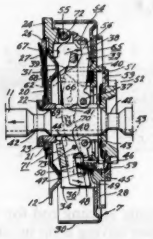
1. A thermocouple junction in a cartridge heater structure having an elongate tubular outer metal sheath having open ends, means sealing the ends of the sheath, a filler of dielectric insulating material in the sheath and a resistance heating element supported in and clear of the sheath by said filler and having contact leads extending through and from one end of the sheath, said filler being compacted tight in the sheath and about said heating element by radially inward swaging of the sheath during manufacture of the heater, said junction comprising a pair of substantially radially extending conical disc in tight peripheral bearing contact with the sheath, in electric isolation from the heating element and in partial nested axial spaced relationship with each other, a pair of thermocouple wires entering the sheath at said one end and extending axially in the sheath in electric isolation from the heating element and each having a connector portion extending substantially radially and in tight pressure contact between the discs, the connector portions last contacting and extending from the disc at predetermined spaced points on said discs, said conical discs being of obtuse angle and in pressure contact with the connector portions and the sheath before the sheath is swaged and being re-formed to a less obtuse angle and into increased pressure and heat conducting contact therewith when the sheath is swaged and said discs are re-formed radially inwardly.

**3,920,964**

## REGISTER PRICE WHEEL STRUCTURE

**Einar T. Young, Newtown Square, Pa., assignor to Sun Oil Company of Pennsylvania, Philadelphia, Pa.**

**Filed July 17, 1974, Ser. No. 489,275**
**Int. Cl.² B67D** *5/22;* **G06C** *15/42*
**U.S. Cl. 235—94 R** **16 Claims**



1. In a counter, an axially shiftable shaft, a number wheel rotatably mounted on the shaft, a rotatable driven gear coaxially disposed at one side of the wheel for rotating the number wheel during a counting operation, a displaceable element in the number wheel actuatable by the shaft for selectively connecting the number wheel to the driven gear, a rotatable member coaxially disposed at the other side of the wheel for rotating the number wheel during a resetting operation, means shiftably mounted on the number wheel and actuatable by the shaft for selectively connecting the number wheel to said member, and fixed stop means engageable by said element to retain the number wheel in zero position upon resetting of the same.

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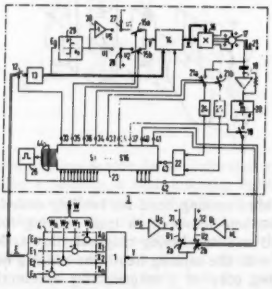
**3,920,965**

## METHOD AND APPARATUS FOR PREDICTIVE CONTROL

**Munir Sohrwardy, Bochum, Germany, assignor to Siemens Aktiengesellschaft, Munich, Germany**

**Filed Mar. 4, 1974, Ser. No. 447,994**
**Claims priority, application Germany, Oct. 3, 1973, 2349725**
**Int. Cl.² G05B** *13/02;* **G06F** *15/46*
**U.S. Cl. 235—150.1** **9 Claims**



1. A method for the predictive control of a control system using a control loop model which reacts considerably faster than the control system and in which two opposite constant control signals which can be selectively activated are used as inputs of the control system and the control loop model comprising continuously performing test runs on the control loop model using the two opposite control signals in order to select a control variable for the control system which control variable is the one which has led to the smallest magnitude of a

simulated control error vector in the test run comprising the steps of:

a. initializing the control loop model at the value of the actual control vector error;
b. operating on the control loop model by one of the two opposite control signals until a first extreme value of a control error vector magnitude is determined;
c. re-initializing the control loop model;
d. acting on the control loop model with the other control signal until a second extreme value is reached;
e. storing said first and second extreme values;
f. comparing said first and second extreme values with each other;
g. initializing the control loop model to the original value;
h. acting on the control loop model with the control signal which in the first two runs led to the largest extreme value as determined by said comparison for a short time interval;
i. acting on the control loop model with the other control signal until an extreme value of the control error vector magnitude is reached to obtain a third extreme value;
j. comparing the third extreme value with the samller of the extreme values obtained from the first two test runs;
k. providing the control signal associated with the smaller extreme value from the first two test runs to the controlled system if the third extreme value is larger and the other control signal to the control system if the third extreme value is smaller.

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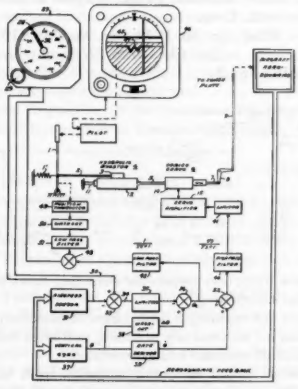
**3,920,966**

## BLENDED MANUAL-AUTOMATIC CONTROL SYSTEM

**Siegfried Knemeyer, Yellow Springs, and Kenneth W. McElreath, Dayton, both of Ohio, assignors to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.**

**Filed Apr. 29, 1974, Ser. No. 464,876**
**Int. Cl.[2] B64C** *13/02*
**U.S. Cl. 235—150.2** **8 Claims**



1. A blended manual-automatic system for controlling the magnitude of a variable in which a human operator is an active element in the control loop of the manual part of the system, comprising:

a. means for generating an error signal proportional to the difference between a desired magnitude of said variable and its actual magnitude, and indicative of the direction of said difference;
b. first means, having a manual input device, for controlling the magnitude of said variable;
c. means for displaying the components of said error signal lying below a predetermined frequency to said operator as a command to be manually executed by the operator through said manual input device;
d. second means, acting in series with said first means and having a command signal input, for controlling the magnitude of said variable independently of said first means in accordance with a command signal applied to its input; and
e. means for applying the components of said error signal lying above said predetermined frequency as a command signal to the input of said second means.

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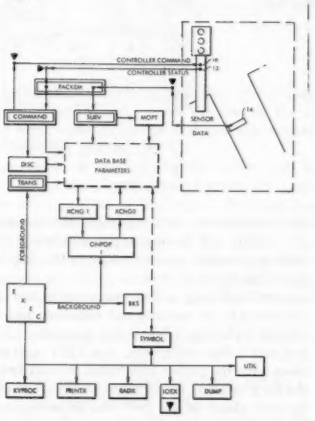
**3,920,967**

## COMPUTERIZED TRAFFIC CONTROL APPARATUS

**Daniel T. Martin, Houston; Morton A. Serrell, Seabrook; Herbert C. Coleman, Houston; Donald L. Cooper, Houston; Robert M. Knox, Seabrook; Curtis L. Barnfield, Houston, all of Tex., and Robert J. Walinchus, Baltimore, Md., assignors to TRW Inc., Redondo Beach, Calif.**

**Continuation of Ser. No. 147,522, May 27, 1971, abandoned.**
**This application Feb. 22, 1974, Ser. No. 444,933**
**Int. Cl.[2] G06F** *15/48*
**U.S. Cl. 235—150.24** **21 Claims**



1. An on-line, real-time traffic control apparatus for optimizing the flow of traffic between a plurality of intersections in a controlled network, said apparatus comprising:

at least one automated detector means in proximity to each of selected ones of the intersections, each of said detector means adapted to generate, in response to the proximate presence of a vehicle, an electrical signal pulse, the commencement of which indicates the commencement of the vehicle presence and the termination of which indicates the termination of the vehicle presence;
at least one signal head in proximity to each of the intersections, said signal head adapted to successively display traffic flow directing lights;
controller means adapted to control the operation of said signal heads;
electronic computer means;
means for electrical communication between said detector means and said computer means and between said computer means and said controller means, said communication means including signal processor means adapted to receive the signal pulses from a plurality of said detector means and to generate, in response to said signal pulses, an encoded binary electrical signal representing both the total number of signal pulses received by said processor means during a specified time span, and the duration of each, said total number indicative of vehicle count and

each of said durations indicative of the speed of a vehicle in proximity to one of said detectors; said computer means

being adapted to receive said encoded binary electrical signals from said processor means and, based thereupon, to generate necessary command electrical signals for said controller means, said command signals transmitted to said controller means through said communication means.

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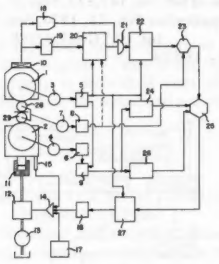
**3,920,968**

## SYSTEM FOR CONTROLLING ECCENTRICITY OF ROLLING MILL

**Isao Imai, and Hiroyuki Shiozaki, both of Yokohama, Japan, assignors to Ishikawajima-Harima Jukogyo Kabushiki Kaisha, Tokyo, Japan**

**Filed June 26, 1974, Ser. No. 483,415**
**Claims priority, application Japan, June 27, 1973, 48-71798**
**Int. Cl.[2] B21B** *37/08*; **G06F** *15/46*
**U.S. Cl. 235—151.1** **3 Claims**



1. In an apparatus for controlling the eccentricity of a first roll of a rolling mill having upper and lower rolls, including

a. rolling pressure sensing means (**10**) for directly sensing eccentricity of the roll,

b. means including a first pulse generator (**3**) and a first counter (**5**) for sensing roll rotation, and

c. means including a first pulse generator (**3**) driven by the roll and a first arithmetic unit (**20**) operable in synchronism with the pulses generated by said first pulse generator for providing factor signals (B and C) of the eccentricity and phase of the roll; the improvement which comprises

d. means including a second arithmetic unit (**22**) for converting the factor signals into optimum factor signals ($B_o$ and $C_o$);

e. means including eccentricity computer means (**27**), sensor means (**8**) responsive to the direction of rotation of the roll, and third arithmetic means (**9**) responsive to the slip angle between the upper and lower rolls for deriving corrected eccentricity and phase signals from said optimum factor signals; and

f. means (**11, 12, 13**) responsive to said corrected eccentricity and phase signals for controlling the gap between the upper and lower rolls to correct the eccentricity of the roll by correcting the variation in thickness between said rolls, thereby to eliminate the variation in thickness of the rolled product caused by eccentricity of the roll.

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**3,920,969**

## DIGITAL GLUCOSE ANALYZER

**Robert E. Berglas, 30 E. End Ave., New York, N.Y. 10028**

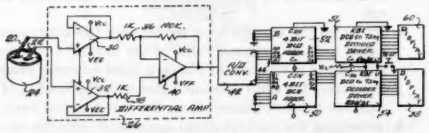
**Filed Jan. 31, 1974, Ser. No. 438,465**
**Int. Cl.[2] G01V** *1/28*; **G01N** *31/00*; **A61B** *5/04*
**U.S. Cl. 235—151.3** **1 Claim**

1. A system for producing a display of glucose in solution comprising:

a sense and reference electrode adapted for placement in a container of solution for producing a differential voltage which varies as a function of the amount of glucose in said solution,

means connected to said electrodes for amplifying said differential voltage and providing an amplified analog signal including a first differential amplifier having one polarity input connected to said reference electrode and an output, a second differential amplifier having one polarity input connected to said sense electrode and an output, a third differential amplifier having one polarity input connected to said output of said first differential amplifier and the other polarity connected to said output of said second differential amplifier and having an output providing said amplified, analog signal.

means connected to said amplifying and providing means for converting said analog signal into a digital signal including a tracking analog to digital signal converter having counter means and providing a binary output,



a binary to binary coded decimal converter connected to said analog to digital signal converter for converting said binary output into a binary coded decimal output, and

a binary coded decimal to 7 segment Decoder/Driver connected to said binary to binary coded decimal converter for converting said binary coded decimal output into a 7 segment signal, and

display means connected to said converting means for receiving said digital signal and producing a visual display of the glucose value associated with said digital signal wherein said display means includes two, 7-segment, incandescent display units.

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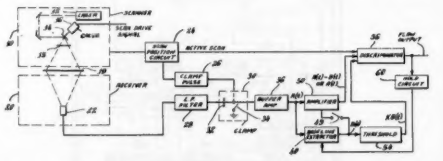
**3,920,970**

## LASER SCANNER FLAW DETECTION SYSTEM USING BASELINE FOLLOWER SIGNAL PROCESSING

**Frank A. Slaker, Norwalk, Conn., assignor to Intec Corporation, Norwalk, Conn.**

**Filed Apr. 30, 1974, Ser. No. 465,510**
**Int. Cl.[2] G01N** *21/32*
**U.S. Cl. 235—151.3** **13 Claims**



1. A flaw detection system for detecting flaws on a surface of material comprising

a. a laser for emitting a laser beam of radiation,

b. means for successively scanning said laser beam across a surface of material being examined,

c. detector means receiving radiation from said material producing a detector signal in response to the intensity of the radiation applied thereto,

d. baseline extractor means having said detector signal applied thereto for providing a baseline signal therefrom,

e. differential circuit means having said detector signal and said baseline signal applied thereto for producing a difference signal between said detector signal and said baseline signal,

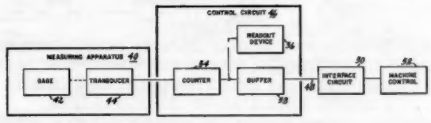
f. threshold means for providing a threshold signal, and

g. discriminator means having said difference signal and said threshold signal applied thereto for producing a flaw output signal when said difference signal exceeds said threshold signal.

## 3,920,971
## OFF-LINE TOOL GAGE

**Robert Charles Bevis; Thiagarajan Viswanathan, both of Cincinnati, Ohio, and Howard Joseph Theis, California, Ky., assignors to Cincinnati Milacron Inc., Cincinnati, Ohio**

**Filed Mar. 28, 1974, Ser. No. 455,556**
**Int. Cl.[2] G06F** *15/46*
**U.S. Cl. 235—151.11** **9 Claims**




**1.** An apparatus for generating dimensional information for a plurality of cutting tools, said apparatus operating in conjunction with and being remotely located from a computer having a storage circuit and controlling a machine tool, the apparatus comprising:

a. a base including means affixed thereto for maintaining a cutting tool in a stationary position;

b. a manually operable gaging apparatus attached to the base for measuring on each cutting tool the distance from a point on the cutting tool to a reference point and providing measurement signals as a function of the distance measured;

c. a control circuit responsive to the measurement signals for storing said measurement signals and generating a corresponding output signal representing the distance measured, said circuit including means for generating an interrupt signal and an identification signal representing a predetermined numerical identification of the cutting tool; and

d. an interfacing circuit connected between the control circuit and the computer and including

1. means for isolating all signals transferred between the control circuit and the computer,

2. means for interrupting the operation of the computer in response to the interrupt signal and transmitting the output signal and a corresponding identification signal to the storage circuit, whereby the output signal is stored in the storage circuit at a location corresponding to the identification signal, and

3. means responsive to the computer for decoding and transmitting signals to the control circuit.

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## 3,920,972
## METHOD AND APPARATUS FOR PROGRAMMING A COMPUTER OPERATED ROBOT ARM

**Merton Dudley Corwin, Jr.; Richard Edward Hohn, and Ronald Lee Tarvin, all of Cincinnati, Ohio, assignors to Cincinnati Milacron Inc., Cincinnati, Ohio**

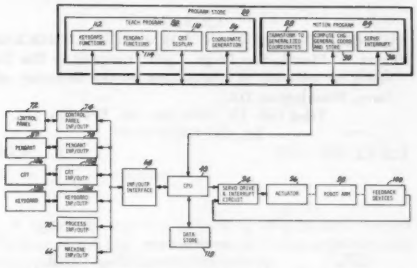
**Filed July 16, 1974, Ser. No. 488,968**
**Int. Cl.[2] B25J** *9/00;* **G06F** *15/46*
**U.S. Cl. 235—151.11** **45 Claims**

**1.** An apparatus for generating a program for a robot arm operated by a controller having a memory thereby integrating said robot arm into a physical process by executing a repetitive cycle of the program in an automatic mode of operation during the execution of said process, said program being comprised in part of input signals representing first coordinate values relative to a first coordinate system of predetermined points being connected by predetermined paths generated during the automatic mode of operation, said robot arm having a plurality of actuators with at least one of said actuators defining an axis of rotation affecting the position of an end of the robot arm, and said robot arm having a geometric configuration defining a generalized coordinate system independent of said first coordinate system, the apparatus comprising:

a. means for producing a command signal to command motion of the end of the robot arm along a selected axis relative to the first coordinate system, said commanded motion being independent of the predetermined paths;

b. means responsive to the command signal for producing sets of first signals representing first coordinate values relative to the first coordinate system of successive end points having a locus along the selected axis;

c. means responsive to the sets of first signals for producing sets of individual control signals representing generalized coordinate values of the end points;




d. means responsive to the sets of individual control signals for causing the actuators to move the end of the robot arm to the end points along the selected axis relative to the first coordinate system;

e. means responsive to the end of the robot arm being moved to each of the predetermined points for transferring to the memory a set of first signals defining a set of input signals and representing first coordinate values of the predetermined point; and

f. means for generating and storing in the memory further input signals to identify one of the predetermined points as a repeat point thereby defining the repetitive cycle of the program.

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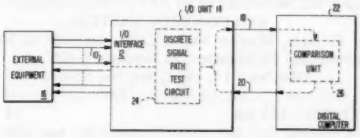
## 3,920,973
## METHOD AND SYSTEM FOR TESTING SIGNAL TRANSMISSION PATHS

**Karl B. Avellar, Ellicott City, and James E. Buchanan, Bowie, both of Md., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.**

**Filed Jan. 9, 1973, Ser. No. 322,239**
*Disclosure was also published under Trial Voluntary Protest Program on Jan. 28, 1975.*
**Int. Cl.[2] G06F** *11/02*
**U.S. Cl. 235—151.31** **13 Claims**




**6.** A system for testing a plurality of paths for transmission of discrete d.c. signal levels comprising:

means for transmitting a configuration of discrete d.c. signal levels over said plurality of paths;

means responsive to and remote from said transmitting means for generating a digital signal representative of the sum of the amplitudes of the discrete signal levels transmitted over said plurality of paths;

means for storing a plurality of digital signals each representative of the sum of the discrete signal levels for a prede-

termined configuration of discrete signal levels transmitted over said paths;

means for ascertaining the configuration of discrete signal levels being transmitted over said plurality of signal paths;

means for selecting one of said plurality of stored digital signals in response to the ascertained configuration;

means for comparing said generated digital signal with said selected one of said stored signals; and,

means operatively connected to said comparing means for indicating a fault in one of said paths in response to an unfavorable comparison of said digital signals.

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## 3,920,974

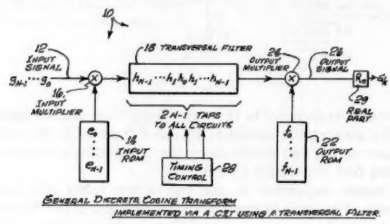
## DISCRETE COSINE TRANSFORM SIGNAL PROCESSOR

**Robert W. Means, San Diego, Calif., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.**

**Filed Oct. 15, 1974, Ser. No. 514,706**

**Int. Cl.[2] G06F** *15/34*

**U.S. Cl. 235—152** **4 Claims**




GENERAL DISCRETE COSINE TRANSFORM IMPLEMENTED VIA A CET USING A TRANSVERSAL FILTER.

1. A signal processor for performing the discrete cosine transform of an input signal having N samples, comprising:

two complex read-only memories, an input and output read-only memory, each containing a total number N of data points arranged in a predetermined manner;

two complex multipliers, an input and an output multiplier, each having an input from one of the read-only memories, the input multiplier having an input which is connectable to the external signal which is to be transformed discretely and cosinusoidally; and

a complex transversal filter, having $2N-1$ taps, the input to the filter being the output of the input multiplier;

the output of the transform processor comprising the real part of the output of the output multiplier.

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## 3,920,975

## DATA COMMUNICATIONS NETWORK REMOTE TEST AND CONTROL SYSTEM

**Larry F. Bass, Mission Viejo, Calif., assignor to Rockwell International Corporation, El Segundo, Calif.**

**Filed Nov. 14, 1974, Ser. No. 523,624**

**Int. Cl.[2] G06F** *11/00*

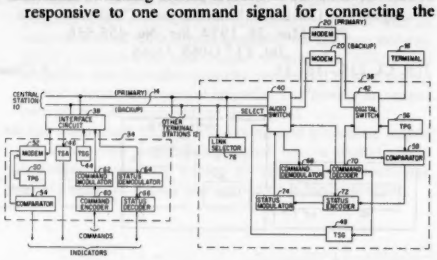
**U.S. Cl. 235—153 AK** **15 Claims**

1. A remote test and control system for use with a data communications network interconnecting a central processing station with at least one remote data terminal station, through a pair of communication links, either of which may be selected for passing data information therebetween, with each remote station containing a data terminal and a pair of modems with the data terminal being adapted for connection to the selected communication link through either modem, comprising:

command signal transmitter means for generating and transmitting command signals over at least one of the communication links, each command signal being addressed to a selected remote station;

individual command signal receiver means located at each remote station for receiving the command signals addressed to its associated station; and

individual switching means located at each remote station responsive to one command signal for connecting the




audio terminals and another command signal for connecting the digital terminals of either one of the associated station modems between the selected one of the two communication links and the station data terminal, respectively.

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## 3,920,976

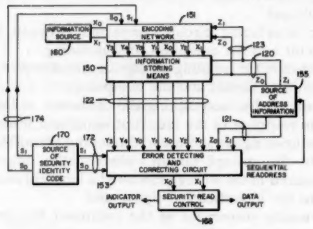
## INFORMATION STORAGE SECURITY SYSTEM

**Bruce A. Christensen, and George A. Raymond, both of Minneapolis, Minn., assignors to Sperry Rand Corporation, New York, N.Y.**

**Filed Aug. 19, 1974, Ser. No. 498,824**

**Int. Cl. G11c** *29/00*; **G06f** *11/12*

**U.S. Cl. 235—153 AM** **2 Claims**




1. In an information storage error detection system, an information store which contains a plurality of binary words each of which contains information bits and parity check bits and is stored at an address in said information store which address is also represented by address bits, a source of address information that is independently coupled to the information store and to an error detecting and correcting circuit, an information source of information bits, an encoding network coupled to said information source for computing a plurality of parity check bits from said information bits and means coupling said information bits and said parity check bits to said information store to be stored as a binary word in a selected one of said addresses in which upon readout of said binary word, said error detecting and correcting circuit detects errors in said information bits, the improvement comprising:

a source of security identity code bits that are independently provided by a user, said source of security identity code bits coupled to said encoding network and to said error detecting and correcting circuit, said encoding network computing a plurality of parity check bits from said information bits and said security identity code bits and storing said information bits and said parity check bits in said information store at a selected one of said

addresses, said error detecting and correcting circuit detecting errors in said binary word for indicating that,

1. said information bits are correct or include an error in one or more bits;
2. said security identity code bits that are independently provided by the user seeking access to the address defined by said address bits do or do not agree with the security identity code bits encoded in said parity checking bits.

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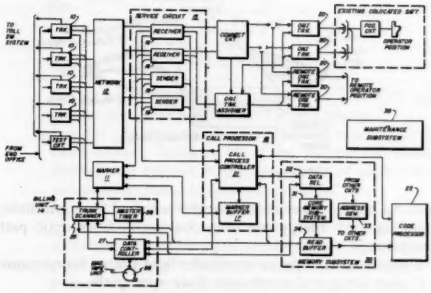
## 3,920,977

## ARRANGEMENT AND METHOD FOR SWITCHING THE ELECTRONIC SUBSYSTEMS OF A COMMON CONTROL COMMUNICATION SWITCHING SYSTEM WITHOUT INTERFERENCE TO CALL PROCESSING

**Martin A. Karsas, Chicago, Ill., assignor to GTE Automatic Electric Laboratories Incorporated, Northlake, Ill.**

**Filed Sept. 10, 1973, Ser. No. 395,801**
**Int. Cl.² G06F *11/04***
**U.S. Cl. 235—153 AE** **4 Claims**



1. In a common control communication switching system wherein the common controls are duplicated and operated in synchronism, the common controls each including a logic unit portion and an associated memory portion, only one of said logic units being on line and communicating with the space shared subsystems of the communication switching system at any one time, a maintenance controller means for checking the operation of the logic units and memories and for providing output signals indicating the failure of one or both of the logic units or memories, an arrangement for switching the duplicated synchronously operating logic units and memories in the event of the failure of the on line logic unit or one of the memories without effecting the communication with the space shared subsystems comprising: (a) first latch means operable to set said logic units on line or on standby, said first latch means normally being operated to preset one of said logic units on line and the other one thereof on standby (b) means operated upon the coincident occurrence of an output signal from said maintenance controller means indicating the failure of said on line logic unit and a system timing pulse occurring during the time said on line logic unit is not communicating with said space shared subsystems to switch said logic units sc that the on line logic unit is set on standby and the logic unit on standby is set on line; and (c) first gating means for gating said logic units to and in communication with said space shared subsystems coupled to and controlled by said first latch means to gate only said one line logic unit to and in communication with said space shared subsystems, whereby switching of the logic units in the event of a failure of the on line logic unit is controlled by said first latch means and is accomplished during the time that the on line logic unit is not communicating with the space shared subsystems so that the communication with the space shared subsystems is not affected.

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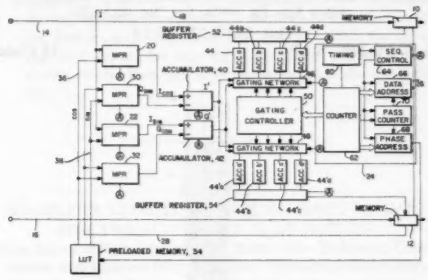
## 3,920,978

## SPECTRUM ANALYZER

**Joseph W. Schmitt, Hudson, and Donald L. Starkey, Amherst, both of N.H., assignors to Sanders Associates, Inc., Nashua, N.H.**

**Filed Feb. 25, 1974, Ser. No. 445,746**
**Int. Cl.² G06F *15/34***
**U.S. Cl. 235—156** **16 Claims**



1. A signal analyzer for generating the discrete Fourier coefficients of a digital data sequence of N data points applied as input thereto, said analyzer comprising

a counter which repetitively cycles through a count of N,

means for storing the data in successive memory locations corresponding to the successive states of the counter which repetitively cycles through a count of N,

means for sequentially retrieving the data in subsets of m points at a time from memory locations derived from the reverse count of the counter,

means for phase shifting each sequentially retrieved data point in accordance with a phase factor derived from the reverse count of said counter,

means for accumulating the phase shifted data points in selected ones of at least one set of *m* registers in accordance with a data weighting factor derived from the reverse count of said counter, and

means for storing the contents of said registers in corresponding ones of the locations from which the data points were retrieved, thereby to complete a pass for said data points.

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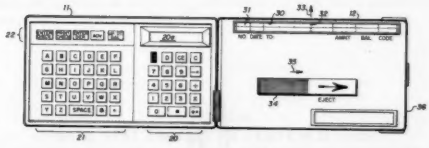
## 3,920,979

## ELECTRONIC CHECK WRITER

**Jack S. Kilby; Robert F. Schweitzer, and John McCrady, all of Dallas, Tex., assignors to Jack S. Kilby, Dallas, Tex.**

**Filed Oct. 19, 1973, Ser. No. 407,804**
**Int. Cl.² G06F *15/02*, *15/30***
**U.S. Cl. 235—168** **14 Claims**



1. A portable electromechanical check writing unit implemented electrically by integrated semiconductor circuits, comprising:

a. an alphanumeric keyset for entering alphanumeric data to said circuits for use on a check,

b. a first storage means in said circuits for storing said data,

c. a function keyset to manually command a checking operation,

d. calculator means in said circuits operable in response to storage of a numerical part of said data to compute a new balance,

e. a second storage means in said circuits for storing said new balance, and

f. a printing unit including means for automatically printing a copy of contents of said first and second storage means.

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**3,920,980**

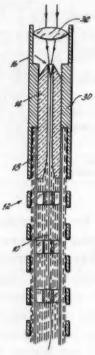
## FLEXIBLE LIGHT GUIDE

**Gunther Nath, Speyerstr, 21, 8 Munich 23, Germany**

**Filed July 18, 1974, Ser. No. 483,676**

**Int. Cl.[2] G02B** *15/14*

**U.S. Cl. 240—1 LP** **16 Claims**



**1.** A flexible light guide comprising, in combination:

a single light-conducting fiber;

a protective shielding containing at least a portion of said fiber; and

a tube containing at least a portion of said fiber including one end of said fiber, said tube having an inner diameter and an outer diameter and made of the same material as said fiber, said one end of said fiber being fused to the end of said tube, said tube and said shielding collectively containing the entirety of said fiber.

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**3,920,981**

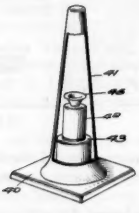
## SIGNAL LAMPS

**John J. Bailey, 4806 W. Chicago Ave., Chicago, Ill. 60651**

**Continuation-in-part of Ser. No. 24,220, March 31, 1970, abandoned, which is a division of Ser. No. 616,108, Feb. 14, 1967, Pat. No. 3,504,339. This application Oct. 6, 1971, Ser. No. 187,027**

**Int. Cl.[2] F21L** *3/00*

**U.S. Cl. 240—22** **8 Claims**



**1.** A signal lamp comprising a relatively flat base having downturned outer edges adapted to be seated on a supporting surface, an elongated tubular body supported at one end on the flat base with the periphery thereof spaced inwardly from the downturned outer edges and extending upwardly from said flat base, said tubular body being constructed of light transmitting material, a head unit mounted in the body intermediate the length thereof and having a source of illumination, a power unit supported upon the flat base and having the head unit mounted thereon, said power unit being operatively connected with the source of illumination of the head unit for illuminating the tubular body along the length thereof, the body being conical with the larger end on the base and wherein the flat base extends outwardly appreciably beyond the periphery of the conical body, said tubular body being stabilized in position by the flat base and the power unit thereon.

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**3,920,982**

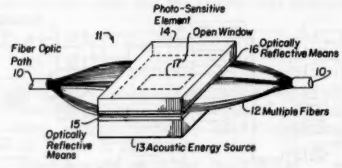
## CONTINUOUS FIBER OPTICAL TRANSMIT AND RECEIVE TERMINAL

**Jay H. Harris, Seattle, Wash., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.**

**Filed Feb. 8, 1974, Ser. No. 440,894**

**Int. Cl.[2] H04B** *9/00*

**U.S. Cl. 250—199** **9 Claims**




**1.** An optical transmit and receive terminal for controllably coupling light energy out of a continuous fiber optic path comprising:

a light source disposed to transfer light energy for transmission along said continuous fiber optic path;

an acoustic energy source of determinable amplitude and frequency positioned to couple acoustic energy across said continuous fiber optic path for causing commensurate refractive index changes as a function of said amplitude and frequency;

means for selectively controlling the actuation of said source of acoustic energy; and

photo-sensitive means positioned proximate to said continuous fiber optic path for receiving light energy laterally diffracted out of said optical path by said refractive index changes and responsive to the diffracted light energy for producing an output signal commensurate with the diffracted light energy received.

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**3,920,983**

## MULTI-CHANNEL OPTICAL COMMUNICATIONS SYSTEM UTILIZING MULTI WAVELENGTH DYE LASER

**John D. Schlafer; Alexander Lempicki; Harold Samelson, all of Wayland, and Vernon John Fowler, Andover, all of Mass., assignors to GTE Laboratories Incorporated, Waltham, Mass.**

**Filed Oct. 10, 1973, Ser. No. 404,969**

**Int. Cl. H04b** *9/00*

**U.S. Cl. 250—199** **13 Claims**

**1.** An optical communications system having a plurality of frequency multiplexed modulated signals in a single beam comprising

a continuous wave dye laser emitting light energy in a like plurality of bands each of which contains a narrow group of wavelengths, the central wavelengths thereof being regularly spaced in wavelength across the spectrum of wavelengths which the dye laser may emit,

means for spatially separating the bands of light energy into a like plurality of generally parallel beams of light, each

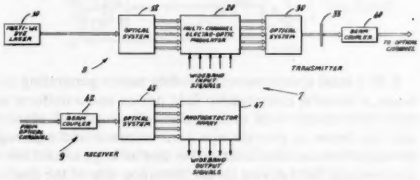
beam of light being restricted to wavelengths of light contained in a different one of the bands.

a multi-channel optical modulator for simultaneously imposing independently wideband information on each of the plurality of bands, the multi-channel optical modulator comprising

means for dividing the light energy in each band into a pair of spatially separated generally parallel, orthogonally polarized components,

a 90° polarization rotator disposed in the path of an identically selected one of each pair of components so that all of the components are similarly plane polarized,

an electro-optic crystal disposed in the paths of all of the similarly plane polarized components and crystallographically oriented so as to effect phase retardation in



the planes in which the components are polarized upon application of an electric field in the planes,

means for applying simultaneously independently modulated electric fields in all of the planes, the electric fields being applied in the two planes of each pair of components being in phase opposition,

a 90° polarization rotator disposed in the path of the other one of each pair of components after the components exit from the electro-optic crystal so that an orthogonal polarization relationship is reestablished between each pair of components, and

means for recombining the pairs of components into a plurality of modulated beams, and,

means for recombining the plurality of modulated beams into a single frequency multiplexed modulated output beam.

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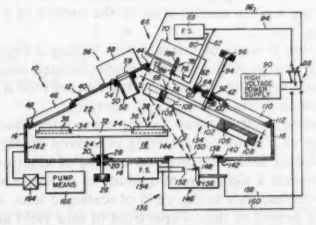
**3,920,984**

## X-RAY ENERGY ANALYZER

**Thomas D. Kirkendall, Potomac, Md., and Howard D. Doolittle, Stamford, Conn., assignors to The Machlett Laboratories, Stamford, Conn.**

**Filed Apr. 8, 1974, Ser. No. 458,944**
**Int. Cl.[2] G01N** *23/20*; **G21K** *1/00*
**U.S. Cl. 250—277** **16 Claims**



1. An energy dispersive X-ray analyzer apparatus including; an evacuable enclosure comprising a hollow housing having means for hermetically attaching X-ray generating means and X-ray detecting means thereto as demountable parts of the enclosure;

sample selecting means comprising a sample holder having means for supporting a plurality of samples within the housing, and means for moving a selected portion of the sample holder into a test position within the enclosure; and

X-radiation selecting means comprising a device holder having means for supporting a plurality of radiation limiting devices including fluorescer devices within the housing, and means for moving a particular portion of the device holder into operative alignment with the test position.

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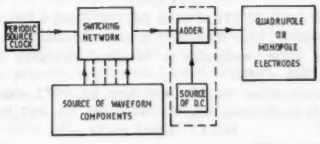
**3,920,985**

## MEANS FOR EFFECTING IMPROVEMENTS TO MASS SPECTROMETERS AND MASS FILTERS

**John Barry Hiller, Thornleight; John Alan Richards, Cranbrook, and Richard Meredyth Huey, Sylvania, all of Australia, assignors to Unisearch Limited, Kensington, Australia**

**Continuation-in-part of Ser. No. 238,564, March 27, 1972. This application Jan. 28, 1974, Ser. No. 437,218**
**Int. Cl. H01j** *39/34*
**U.S. Cl. 250—281** **19 Claims**




1. In a mass spectrometer of the quadrupole type, the improvement comprising a single generating means for generating a single periodic time varying electrical output potential having both A.C. components and a D.C. component, said potential having a segmented waveform formed by a repetitive sequence of discrete substantially linear segments each being composed of at least one substantially linearly varying function of time, and said generating means being operatively coupled to said mass spectrometer such that said potential may be applied to analyzing electrodes of said mass spectrometer.

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**3,920,986**

## MASS SPECTROMETER SYSTEM HAVING SYNCHRONOUSLY PROGRAMMABLE SENSITIVITY

**William J. Fies, Jr., Portola Valley, Calif., assignor to Finnigan Corporation, Sunnyvale, Calif.**

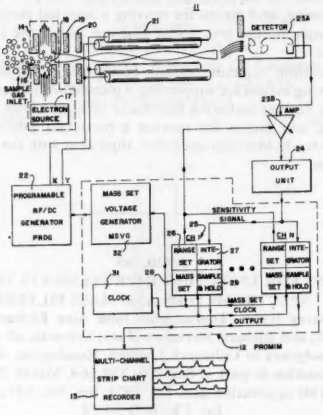
**Filed Feb. 28, 1974, Ser. No. 446,775**
**Int. Cl.[2] B01D** *59/44*
**U.S. Cl. 250—282** **8 Claims**

1. A mass spectrometer system for mass fragmentography comprising:

a mass spectrometer having a cyclically scanned mass filter for sampling multiple ion mass fragments over sample time periods, and

means for separately programming the mass spectrometer

sensitivity for each mass filter sample time period independent of other sample time periods so that the mass




spectrometer sensitivity corresponds with the amplitude of the ion mass fragments sampled.

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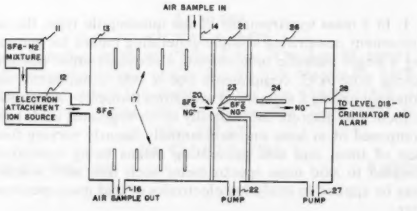
**3,920,987**

## METHOD AND SYSTEM FOR DETECTING EXPLOSIVES

**Michael Anbar, Palo Alto, and John T. Moseley, Sunnyvale, both of Calif., assignors to Stanford Research Institute, Menlo Park, Calif.**

**Continuation of Ser. No. 288,960, Sept. 14, 1972, abandoned. This application Aug. 6, 1974, Ser. No. 495,206**
**Int. Cl.[2] H01J** *39/34*
**U.S. Cl. 250—282** **3 Claims**



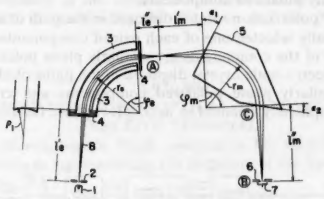

1. A method for detecting concentrations of polynitro molecules in an air sample comprising the steps of introducing an air sample which is not ionized into a reaction chamber, providing a single negatively ionized gas in the reaction chamber whereby the ionized gas mixes with the air sample, said negatively ionized gas having an electron affinity greater than that of normal atmospheric constituents and less than that of polynitro compounds of NG or TNT whereby said ionized gas selectively transfers electrons whereby the polynitro molecules in the air sample to form negative ions thereof, applying a drift field to the mixture in the reaction chamber to transport the negative ions therein in a desired direction out of the reaction chamber, mass filtering the thus transported ions to separate out polynitro ions, generating an electrical current by the polynitro ions, and measuring the electrical current to provide an indication of the polynitro concentration in the air sample.

**3,920,988**

## MASS SPECTROMETER

**Shunroku Taya, Uenohara, and Hisashi Matsuda, Takarazuka, both of Japan, assignors to Hitachi, Ltd., Japan**

**Filed May 7, 1974, Ser. No. 467,788**
**Claims priority, application Japan, May 7, 1973, 48-49789**
**Int. Cl. G01t** *5/00*
**U.S. Cl. 250—296** **3 Claims**



1. In a mass spectrometer including means generating an ion beam, a toroidal electrostatic field device and a uniform magnetic field device with end portions disposed with respect to said ion beam to provide non-zero entrance and exit angles, the improvement characterized in that an edge of said toroidal electrostatic field device on the entrance side of the ion beam forms a concave surface, and that the entrance angle into said uniform magnetic field device is oriented in the positive direction while the exit angle therefrom is oriented in the negative direction, whereby the elimination of second-order aberrations and focusing in the axial direction are made possible.

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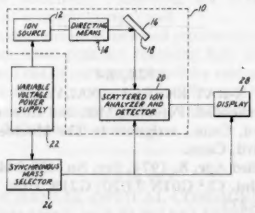
**3,920,989**

## ION SCATTERING SPECTROMETER UTILIZING CHARGE EXCHANGE PROCESSES

**Robert L. Erickson, Fridley, Minn., and David P. Smith, Village of North Hudson, Wis., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.**

**Filed Sept. 20, 1974, Ser. No. 507,713**
**Int. Cl.[2] H01J** *37/00*
**U.S. Cl. 250—307** **10 Claims**




1. An ion scattering spectroscopic method for investigating atoms having a given atomic mass on the surface of a material comprising

a. directing a beam of primary ions having a known mass and known charge state toward a predetermined area on said surface and varying the kinetic energy thereof over a range of predetermined primary ion kinetic energies;

b. detecting scattered ions having a predetermined loss of energy as a result of scattering at a given angle;

c. correlating said detecting and varying of kinetic energies to generate a signal the magnitude of which at any given time corresponds to the yield of scattered ions, affording over a period of time a spectrum of said yield as a function of the primary ion kinetic energies, which spectrum is indicative of electron exchange processes associated with the identity of and electronic states in said atoms.

## 3,920,990
## DEVICE FOR ANALYSING A SURFACE LAYER BY MEANS OF ION SCATTERING

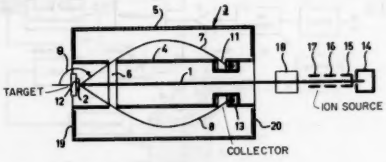
**Jacob Maria Van Nieuwland; Nicolaas Hazewindus, and Adrianus Martinus Maria Otten, all of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.**

**Filed May 2, 1974, Ser. No. 466,220**

**Claims priority, application Netherlands, May 8, 1973, 7306378**

**Int. Cl.[2] G01M** *23/00*

**U.S. Cl. 250—309** **2 Claims**




1. A device for analyzing a surface layer by means of ion scattering, comprising:
   a. means for producing a substantially mono-energetic primary ion beam and comprising an ion source;
   b. a substantially annular diaphragm aperture adapted to pass said ions scattered at said surface layer at a predetermined angle with respect to the axis of said ion beam, said angle exceeding 90° with respect to the original direction of said primary ion beam;
   c. an electrostatic analyzer comprising two substantially cylindrical hollow electrodes coaxially disposed with respect to each other, said analyzer having an axis substantially coincident with said primary ion beam axis and being substantially coaxial with said diaphragm aperture, said ion source being disposed at a first end of said analyzer and said surface layer being disposed at the opposite second end of said analyzer; and
   d. detector means for determining the kinetic energy of those of said scattered ions passing through said diaphragm aperture, said detector means comprising a substantially annular detector element that is coaxial with said analyzer and extends around said primary ion beam axis, said detector being removed from said surface layer in the direction of said ion source.

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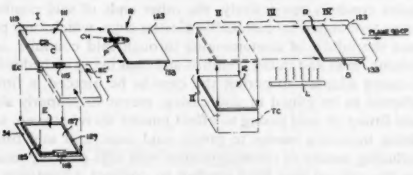
## 3,920,991
## IONOGRAPHIC FILM PROCESSOR AND ASSOCIATED METHOD

**Joseph R. Baker; William W. Busche, and Sidney E. Hindell, all of San Diego, Calif., assignors to Diagnostic Instruments, Inc., San Diego, Calif.**

**Continuation of Ser. No. 300,311, Oct. 24, 1972, abandoned. This application Mar. 18, 1974, Ser. No. 452,070**

**Int. Cl. G03g** *15/00*

**U.S. Cl. 250—315** **15 Claims**



1. Apparatus for automatically developing and fixing a latent electrostatic image carried on a rigid imaging plate having a high degree of flatness at least across an image-carrying portion thereof, said imaging plate constituting a portion of a cassette held in an assembled condition by a surrounding packaging envelope, comprising:
   a transport path along which said imaging plate is unidirectionally moved;
   an entry station including means for manually injecting an exposed ionographic cassette and moving it to the transport path, and envelope piercing and slitting means for automatically disassembling the cassette during said movement to separate the imaging plate therefrom whereby as the cassette is moved toward the transport path the envelope is progressively slit to free the assembled components of the cassette;
   a development station including means for bringing the imaging plate into sealing engagement with a development chamber wherein the electrostatic image is contacted by a cloud of toner particles thereby to form a visible image on the plate;
   a fixing station comprising means for fixing the image-defining toner particles on the plate;
   an exit station including means for delivering the imaging plate carrying a developed and fixed image thereon; and conveyor means for progressively advancing the imaging plate along the transport path from the entry station to the development station past the fixing station and to the exit station and for effecting a dwell period of predetermined duration of the imaging plate at the development station, all without adversely effecting the image-carrying portion or bending or distorting the flat imaging plate.

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## 3,920,992
## PROCESS FOR FORMING DEVELOPABLE ELECTROSTATIC CHARGE PATTERNS AND DEVICES THEREFOR

**Jan Van den Bogaert, Schilde; Willy Joseph Palmans, Kessel, and Karel Alfons Van den Eynde, Deurne-Zuid, all of Belgium, assignors to Agfa-Gevaert, Mortsel, Belgium**

**Filed Nov. 30, 1973, Ser. No. 420,560**

**Claims priority, application United Kingdom, July 16, 1973, 33744/73**

**Int. Cl. G03b** *41/16*

**U.S. Cl. 250—315** **31 Claims**

1. A method of recording information as a pattern of electrostatic charges carried by an insulating charge receiving medium which comprises:
   a. exposing to a pattern of X- or γ-rays an imaging chamber containing an ionizable gas having an atomic number of at least 36 and adapted to produce therein upon such exposure electrostatic charges in a corresponding pattern, while maintaining said gas during said exposure under superatmospheric pressure;
   b. electrically biasing the charges in said pattern toward an array of discrete closely spaced photoconductors disposed along one side of said chamber generally normal to the exposure direction within a frangible insulating matrix, said conductors extending from the interior to the exterior of said chamber wall and thus acquiring at their external ends during such exposure a differentially charged condition according to said pattern;
   c. arranging in at least close proximity to the exterior ends of said array an insulating charge receiving material, said material developing a differentially charged condition according to said pattern under the influence of the differentially charged condition of the exterior conductor ends; and

d. while said chamber is maintained under said superatmospheric condition, mechanically biasing said charge-receiving material over an area at least coextensive with said matrix against the exterior side of said matrix with a force opposing the gas pressure exerted against the inner side of said matrix.

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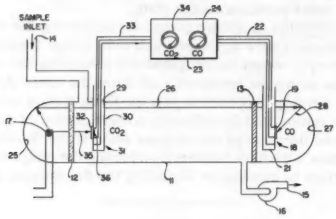
## 3,920,993
## PIGGYBACK OPTICAL BENCH

**Carl N. Cederstrand, Brea, and Jack J. Keegan, Fullerton, both of Calif., assignors to Beckman Instruments, Inc., Fullerton, Calif.**

**Filed Sept. 18, 1974, Ser. No. 506,984**
**Int. Cl.[2] G01N *21/26***
**U.S. Cl. 250—343** **11 Claims**




1. An optical bench for separate detection of two molecular constituents in a sample gas by determination of absorption of radiant energy passed through the sample, said bench comprising in combination:

a chamber enclosing a longitudinally extending sample cell having first and second ends,

a source of radiant energy mounted at the first end of the cell,

first and second windows transparent to the radiant energy at the first and second ends of the cell and enclosing the cell at the ends to form an elongated gas-containing cell with first and second ends,

a first sensor in the chamber at the first end of the cell, the first window being between the radiant energy source and the first sensor,

a second sensor at the second end of the sample cell, the second window being mounted between the gas-containing cell and the second sensor, the chamber having sample inlet and outlet openings at the ends thereof, the sensors being selectively responsive to two different molecular sample gas constituents, whereby radiant energy passing through the first window affects the first sensor, radiant energy passing through both windows affects the second sensor to produce simultaneous indications by the sensors of two different constituents of the sample gas.

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## 3,920,994
## HORIZON SENSOR

**Donald R. Cargille, Venice, Calif., assignor to Hughes Aircraft Company, Culver City, Calif.**

**Filed June 3, 1974, Ser. No. 475,679**
**Int. Cl.[2] G01J *1/00***
**U.S. Cl. 250—347** **6 Claims**

1. A horizon sensor comprising, in combination:

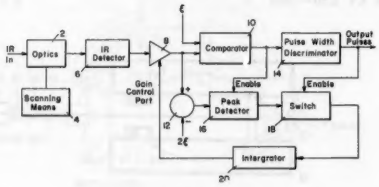
an infrared detector for producing an output signal in response to radiant energy input thereto;

means for scanning said infrared detector across a spatial region which includes at least one radiant body;

a high-pass amplifier having at least one input and an output, one of said inputs being coupled to the output of said infrared detector, said amplifier having a response characteristic sensitive to the rate-of-change of the detector output signal at a crossing of a horizon of a radiant body and substantially insensitive to gradual changes through a scan across said radiant body;

first means coupled to said amplifier output for generating output pulses of substantially constant amplitude during the time interval wherein said amplifier output signals exceed a reference level;

second means coupled to said first means for transmitting at least a portion of those output pulses corresponding to horizon crossings of a preselected radiant body;




third means coupled to the output of said amplifier for selecting and holding the peak amplitude of the output signals of said high-pass amplifier corresponding to horizon crossings of said preselected radiant body;

fourth means responsive to said peak amplitude for setting a fixed ratio between said reference level and the peak amplitude of the output signals of said high-pass amplifier corresponding to said preselected radiant body; and

fifth means for coupling the transmitted output pulses from said second means to a utilization device.

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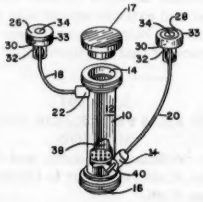
## 3,920,995
## RADIOACTIVE MATERIAL GENERATOR

**Thomas V. Czaplinski, North Brunswick; Bernard J. Bolter, Trenton; Robert E. Heyer, Hopatcong, and Gerald A. Bruno, Shrewsbury, all of N.J., assignors to E. R. Squibb & Sons, Inc., Princeton, N.J.**

**Continuation-in-part of Ser. No. 357,433, May 4, 1973, abandoned. This application May 20, 1974, Ser. No. 471,636**
**Int. Cl.[2] G01M *21/24***
**U.S. Cl. 250—432** **7 Claims**



1. A generator for sterile, elutable radioactive material which comprises a hollow column containing elutable radioactive material, said column including inlet and outlet ports which are each in communication with one end of inlet and outlet conduits respectively, the other ends of said conduits being terminated by pierceable closure caps, which caps prevent the inflow of contaminents through said conduits, said column, inlet and outlet conduits and caps being embedded in a casing adapted to permit the caps to be pierced, a fitting adapted to be joined to said casing, means to properly align said fitting on said casing to effect joinder therebetween, said fitting including means to pierce said caps, and said fitting including means in communication with said piercing means for the cap on said inlet conduit to connect a container of eluent, said eluent being passable through said inlet conduit into said column, means in communication with said piercing means for the cap on said outlet conduit to connect a collecting container for eluate to said fitting, and means to establish

a pressure differential between said eluent and collecting containers causing the eluent to flow through said conduits and into said collecting container.

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3,920,996

## LOSS OF POWER INDICATOR

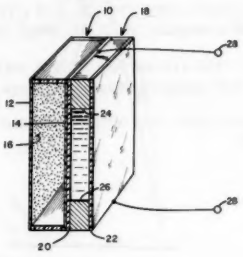
**Harry W. Moore, III., St. Croix Beach, Minn., assignor to Sperry Rand Corporation, New York, N.Y.**

**Filed Sept. 19, 1973, Ser. No. 398,625**

*Disclosure was also published under Trial Voluntary Protest Program on Jan. 28, 1975.*

**Int. Cl.[2] G01T** *1/10*

**U.S. Cl. 250—459** **2 Claims**




**1.** A method of providing an observable manifestation of a drop in electrical voltage comprising the steps of:

a. providing a self-contained radiation stimulated phosphor light source;

b. positioning a nematic liquid crystal electrooptic type cell in the path between said light source and an observer; and

c. connecting the electrodes of said cell to the electrical voltage to be monitored such that when said voltage is above a predetermined threshold said cell is optically opaque and when said voltage is below said threshold, said cell is optically transparent.

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3,920,997

## APPARATUS FOR HOLDING FILM CASSETTES IN X-RAY MACHINES

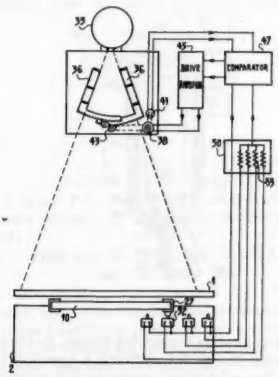
**Joseph Munch, Deurne, Belgium, assignor to Compagnie Generale de Radiologie, Paris, France**

**Filed Oct. 11, 1974, Ser. No. 514,084**

**Claims priority, application Belgium, Oct. 12, 1973, 53140**

**Int. Cl.[2] G03B** *41/16*

**U.S. Cl. 250—468** **5 Claims**




**1.** An apparatus for holding film cassettes in X-ray machines including a plane surface, located at a predetermined distance from other elements of the X-ray machine, for example from the anti-diffusing screen, and, arranged on that plane surface, an assembly of gripper arms with overhanging edges for holding the film cassette for an X-ray exposure, and including means, actuated by said gripper arms or by their linkage mechanism, for generating an electrical signal to control the diaphragm of the X-ray machine according to the width of the film cassette, and further including a stop to define the position of the cassette on said plane surface, the improvement comprising:

A. a plurality of push buttons, disposed in said plane surface, each push button including a spring urging said push button to emerge from said plane surface for pushing said film cassette against the overhanging edges of said gripper arms;

B. electrical switches, there being one switch associated with and actuated by each of said push buttons; and

C. a control mechanism for regulating the diaphragm of the X-ray machine, whereby the condition of said electrical switches is used by the control mechanism to control the diaphragm depending on the length of the particular film cassette located on said plane surface.

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3,920,998

## PHOSPHOR FOR THERMOLUMINESCENT RADIATION DOSIMETER

**Naohiro Nada, Nishinomiya, and Tadaoki Yamashita, Hirakata, both of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan**

**Division of Ser. No. 138,118, April 28, 1971. This application Mar. 5, 1974, Ser. No. 449,207**

**Claims priority, application Japan, May 29, 1970, 45-46730**

**Int. Cl. G01t** *1/11*

**U.S. Cl. 250—484** **2 Claims**

**1.** A method for detecting and measuring radiation comprising exposing a thermoluminescent radiation dosimeter consisting of a major amount of beryllium oxide and a small amount of at least one activator selected from the group consisting of lithium, sodium and potassium to radiation; heating the dosimeter so that thermoluminescent radiation is given off; and measuring the intensity of the thermoluminescent radiation to determine the amount of radiation to which the dosimeter has been exposed, said dosimeter being capable of measuring high radiation dosages greater than 1000 roentogens.

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3,920,999

## X-RAY SOURCE

**Günter Drexler, Oberschleissheim; Werner Panzer, Munich, and Hans Schöfer, Munich, all of Germany, assignors to Gesellschaft für Strahlen- und Umweltforachung mbH Müenchen, Neuherberg, Germany**

**Filed Nov. 27, 1973, Ser. No. 419,293**

**Claims priority, application Germany, Dec. 12, 1972, 2259382**

**Int. Cl. G01n** *23/22*

**U.S. Cl. 250—493** **17 Claims**

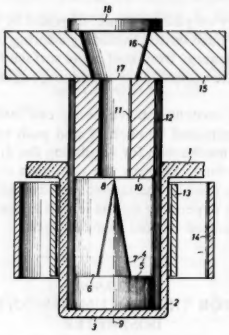
**1.** An X-ray source for generating monoenergetic X-rays of high intensity, including a source of primary radiation having a cylindrical shape and a longitudinal axis, comprising in combination:

a. a body disposed in said axis for emitting an X-ray fluorescence radiation in response to the excitation by said source of primary radiation;

b. a primary filter surrounding said scattering body for separating said source of primary radiation from said scattering body;

c. a collimator adjoining said scattering body in the direction of said axis, said collimator including means defining a throughgoing bore extending along said axis away from said scattering body and having an open end remote from said scattering body;

d. a diaphragm adjoining said collimator at said open end, said diaphragm including means defining an aperture therein, said aperture being in registry with said open end of the collimator bore; and



e. a secondary filter covering said aperture of said diaphragm.

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**3,921,000**

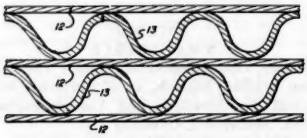
## GAMMA RAY CAMERA SYSTEM WITH CORRUGATED COLLIMATORS

**Gerd Muehllehner, Mount Prospect, Ill., assignor to G. D. Searle & Co., Skokie, Ill.**

**Continuation-in-part of Ser. No. 332,934, Feb. 16, 1973, and Ser. No. 260,188, June 6, 1972, abandoned, which is a division of Ser. No. 52,924, July 7, 1970, abandoned. This application May 7, 1973, Ser. No. 357,917**

**Int. Cl. G21f** *5/02*

**U.S. Cl. 250—505** **1 Claim**



1. A gamma ray camera system for imaging an in vivo distribution of a radioactive material which emits gamma rays comprising:

a gamma ray detector, including a transducer sensitive to gamma rays, of the type producing output signals delineating spatial coordinates of interaction of gamma rays with said transducer; and

a gamma ray collimator adapted to be mounted adjacent said transducer comprising a plurality of straight strips of lead foil and a plurality of corrugated strips of lead foil, said corrugated strips each having corrugations which focus substantially to a common point and are generally wider and deeper on the side more remote from said common point such that said straight strips and corrugated strips provide a collimator with multiple channels focused substantially to a common focus.

**3,921,001**

## SCREENING OR APERTURE DEVICE FOR AN X-RAY APPARATUS

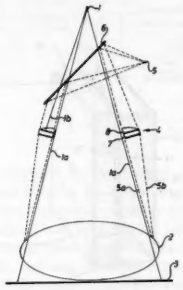
**Paul Ragnvald Edholm, Linkoping, and Nils Bertil Jacobson, Solna, both of Sweden, assignors to Medinova AB of Sweden, Solna, Sweden**

**Filed Aug. 14, 1973, Ser. No. 388,239**

**Claims priority, application Sweden, Aug. 21, 1972, 10836/72; Nov. 29, 1972, 15535/72The portion of the term of this patent subsequent to Feb. 13, 1990, has been disclaimed.**

**Int. Cl.² H01J** *5/16*

**U.S. Cl. 250—510** **7 Claims**



1. A screening or aperture device for an x-ray apparatus comprising plates of x-ray absorbing material displaceable in relation to each other for defining an aperture in order to limit the x-ray beam to a desired irradiation area of the object and a light source adapted to transmit a light beam against the plates for creating on the object a light pattern visualizing the position of the plates and thereby the irradiation area of the object, wherein optical means are connected with the aperture defining edges of the plates for concentrating the light incident upon the optical means from the light source to a line pattern of high intensity defining the peripheral extent of the irradiation area on the object.

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**3,921,002**

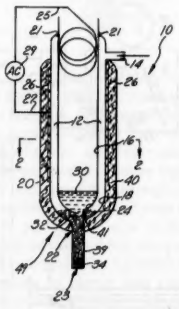
## OZONE GENERATOR

**Laurence O. Williams, and Robert T. Anselmi, both of Littleton, Colo., assignors to Martin Marietta Corporation, New York, N.Y.**

**Filed Apr. 22, 1974, Ser. No. 462,622**

**Int. Cl.² C01B** *13/10, 13/11*

**U.S. Cl. 250—533** **11 Claims**



1. Apparatus for use in converting oxygen to concentrated ozone comprising means for defining a reaction chamber, conduit means for conducting oxygen to said reaction chamber, means for converting the oxygen in said reaction chamber

to liquid ozone, said reaction chamber having an outlet portion through which ozone is conducted, means for maintaining a body of liquid ozone in said outlet portion for blocking flow of unreacted oxygen through the outlet portion, and means for suppressing the explosive decomposition of the concentrated ozone including means for segregating said concentrated ozone into volumes of controlled size.

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**3,921,003**

## APPARATUS FOR IDENTIFYING COINS

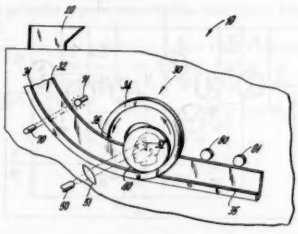
**Walter John Greene, Sunnyvale, Calif., assignor to Mars, Inc., McLean, Va.**

**Filed Oct. 2, 1974, Ser. No. 511,433**

**Claims priority, application United Kingdom, Oct. 3, 1973, 46186/73**

**Int. Cl.² G06K 7/14; G07D 5/00; G07F 1/04**

**U.S. Cl. 250—557** **10 Claims**



1. An apparatus for identifying acceptable coins, comprising a coin track assembly including a circular coin track loop around which coins can roll, sensor means focused at the center of the circular coin track loop for generating a signal in response to the coin surface pattern as a coin rolls around the circular coin track loop, and means for monitoring the signal output from the sensor means to identify acceptable coins.

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**3,921,004**

## VEHICLE SAFETY DEVICE

**Pamela J. Stark, P.O. Box 18, and James A. Stark, c/o Dexter Machine Company, 229 Burlington, both of Clarendon Hills, Ill. 60514**

**Filed July 29, 1974, Ser. No. 492,732**

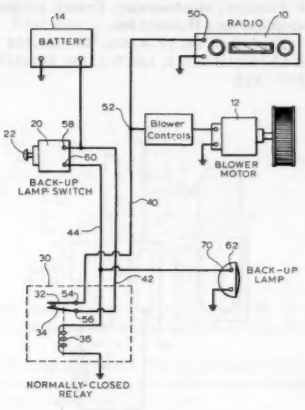
**Int. Cl.² H02J 1/02**

**U.S. Cl. 307—10 R** **9 Claims**

1. A safety device for use with vehicles having a reverse gear and associated shifting mechanism and having an electrically powered noise producing accessory device connected to a power supply, said safety device comprising:

a relay having a normally closed contact electrically connecting the accessory device to the power supply,

means for opening the contact of said relay when the reverse gear is engaged by its associated shifting mechanism




whereby the electrical connection between said accessory device and power supply is broken.

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**3,921,005**

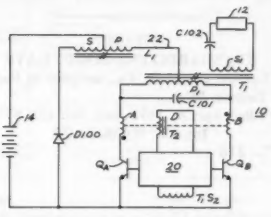
## EMERGENCY LIGHTING SYSTEM WITH HIGH EFFICIENCY INVERTER

**Donald L. Watrous, Liverpool, N.Y., assignor to General Electric Company, Indianapolis, Ind.**

**Filed Dec. 19, 1974, Ser. No. 534,660**

**Int. Cl.² H02J 9/00**

**U.S. Cl. 307—64** **25 Claims**



1. An emergency lighting circuit for operating at least one gaseous discharge lamp comprising:

means for coupling to an AC energy source for energizing the lamp during normal conditions when the Ac source voltage is above a predetermined value;

means including a tuned inverter for operating the lamp during emergency conditions when the AC source voltage is below a predetermined value, the inverter having a pair of transistors capable of operation in a low loss switching mode;

means enabling the transistors to operate in the low loss switching mode;

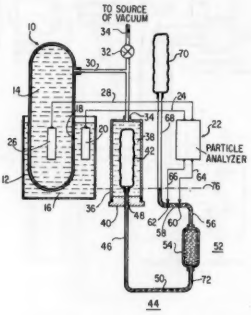
a control circuit supplying base drive for switching the transistors at zero collector voltage thereof; and

means providing timing information to the control circuit for effecting switching of the respective transistors in step with a natural resonant frequency of the inverter.

## 3,921,006
## PARTICLE COUNTING APPARATUS INCLUDING ISOLATED MANOMETER

**Jacques A. Pontigny, Montmorency, France, assignor to Coulter Electronics, Inc., Hialeah, Fla.**

**Filed Sept. 16, 1974, Ser. No. 506,298**
**Int. Cl.² H01H** *35/18; G01N 27/00;* **G01L** *7/18*
**U.S. Cl. 307—118** **19 Claims**




**1.** An apparatus particularly adopted for use in a particle study device wherein pressure differential causes a suspension of particulate matter to pass through an aperture, said apparatus including in combination,

a housing defining a chamber and having an inner flexible inelastic portion,

manometer means having a first open end coupled to said chamber inner portion,

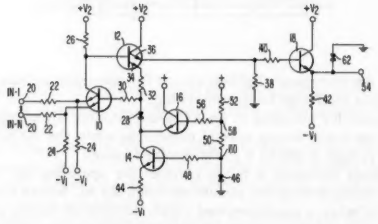
means for displacing the manometer fluid from said manometer means into said chamber inner portion to expand same and create a disequilibrium in said manometer, said manometer fluid upon a removal of said displacing means exiting said portion, collapsing said portion and creating a pressure differential in said chamber, and

coupling means coupling said chamber to said device for coupling said pressure differential thereto.

## 3,921,007
## STANDARDIZING LOGIC GATE

**William A. Lacher, Lansdale, Pa., assignor to Burroughs Corporation, Detroit, Mich.**

**Filed Apr. 8, 1974, Ser. No. 458,877**
**Int. Cl.² H03K** *19/22*
**U.S. Cl. 307—218** **4 Claims**




**2.** A logic system comprising:

a source of binary signals;

first transistor means having a collector terminal, a base terminal, a plurality of emitter terminals, and a single base region;

first means for applying between said base terminal and each of said plurality of emitter terminals said source of binary signals;

second transistor means having a first and a second emitter terminal and a common base region coupled to said collector terminal, said collector terminal being coupled to said common base region;

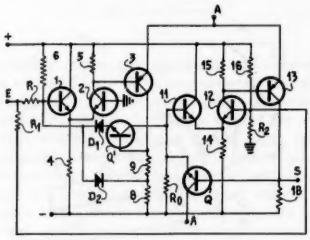
second means coupled to said first emitter terminal and said base terminal and responsive to said first means and said source of binary signals for controlling the gain of said logic system; and

third means coupled to said second emitter terminal and responsive to said source of binary signals and said first transistor means for providing an output signal for said logic system.

## 3,921,008
## WIDE DYNAMIC RANGE LOGARITHMIC AMPLIFIER ARRANGEMENT

**Claude Claverie, Paris, France, assignor to Thomson-CSF, Paris, France**

**Filed Feb. 21, 1974, Ser. No. 444,660**
**Claims priority, application France, Feb. 27, 1973, 73.06904**
**Int. Cl.² G06G** *7/12*
**U.S. Cl. 307—230** **4 Claims**




**1.** A logarithmic amplifier arrangement having an input and an output and comprising: a differential amplifier having first and second inputs and an output forming the output of said arrangement; a junction type semi-conductor element, connected between said first input and said output of said differential amplifier; a compensating circuit formed by first and second resistors connected to said second input of said differential amplifier and, respectively, ground and the input of said arrangement, for compensating the voltage drops produced by the parasitic resistances of said semi-conductor element; and a limiting circuit having an input connected to said input of the arrangement and an output connected to said first input of said differential amplifier for bringing to a minimum threshold value those values of input signal lying below said threshold vlaue.

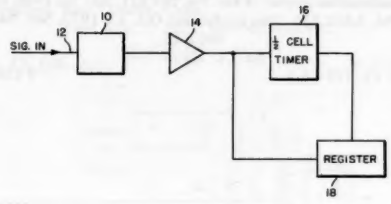
## 3,921,009
## RECEIVER FOR PULSE WIDTH MODULATED SIGNALS

**Enrique G. Comas, Fairport, and Michael G. Emler, Rochester, both of N.Y., assignors to Stromberg-Carlson Corporation, Rochester, N.Y.**

**Filed Apr. 12, 1974, Ser. No. 460,288**
**Int. Cl.² H03K** *9/08, 5/00*
**U.S. Cl. 307—234** **2 Claims**

**1.** A receiving and decoding circuit for pulse width modulated signals of the return-to-zero kind in which the successive bit cells are of approximately equal durations comprising an amplifier, means for applying the incoming pulse width modulated signal to the input of said amplifier, an interval timer set to time an interval approximately equal to one half the duration of one of the bit cells of the incoming signal, a steppable signal storage medium, means for applying the output of said

amplifer to said interval timer and to the signal input terminal of said storage medium, and means for applying the output of




said interval timer to said storage medium to cause it to step at the end of each interval timed by said timer.

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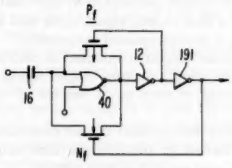
## 3,921,010
## PEAK VOLTAGE DETECTOR CIRCUITS

**Roger Thomas Griffin, Flackwell Heath, England, assignor to RCA Corporation, New York, N.Y.**

**Filed Aug. 20, 1973, Ser. No. 389,726**
**Claims priority, application United Kingdom, Dec. 18, 1972, 58282/72**
*Disclosure was also published under Trial Voluntary Protest Program on Jan. 28, 1975.*
**Int. Cl.² H03K** *5/153, 19/38, 19/40*
**U.S. Cl. 207—235 A** **37 Claims**




**21.** An electronic circuit comprising:

first and second semiconductor devices of different conductivity types arranged in complementary symmetry and each having a conduction path and a control electrode, their conduction paths being coupled in series between two operating voltage terminals;

an output terminal connected to the coupling between said two conduction paths;

input terminal means including an input point at a common connection to said control electrodes of said two devices; and

a feedback path coupled between said output terminal and said input terminal means; and

means coupled to said input terminal, means responsive to the peak values in a given sense of an input signal applied to said input terminal means for activating and then deactivating said feedback path each time said input signal reaches said peak value in said given sense.

**35.** In combination:

an inverter having an input terminal and an output terminal;

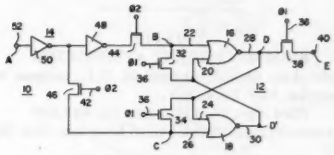
a normally open feedback circuit connected between said two terminals; and

means coupled to said input terminal and responsive to the peaks, in a given sense, of the input signal applied to said input terminal for closing and then reopening said feedback path during each such peak of said input signal.

## 3,921,011
## MOS INPUT LATCH CIRCUIT

**Rodney H. Orgill, Tempe, Ariz., assignor to Motorola, Inc., Chicago, Ill.**

**Filed June 3, 1974, Ser. No. 475,535**
**Int. Cl.² H03K** *5/153, 17/60*
**U.S. Cl. 307—251** **14 Claims**




**1.** A latch circuit for producing, in response to an input signal, an output signal having a well-defined logic level cocmprising:

first and second gates each having an output and first and second inputs, each gate having its output coupled to said first input of said other gate; and

level-defining coupling means coupled between said output of one of said gates and said second input of the other of said gates for coupling an intermediate voltage at said output of said one gate to said second input of said other gate to determine the state of said latch circuit.

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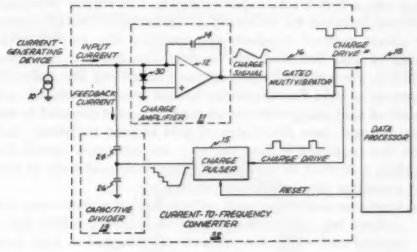
## 3,921,012
## WIDE-RANGE CURRENT-TO-FREQUENCY CONVERTER

**J. Howard Marshall, III, Pasadena, Calif., assignor to MDH Industries Inc., Pasadena, Calif.**

**Filed Nov. 11, 1974, Ser. No. 522,744**
**Int. Cl.² H03K** *1/16*
**U.S. Cl. 307—271** **21 Claims**




**1.** For use in combination in a circuit capable of quantizing small currents, an improved wide-range current-to-frequency converter comprising:

a. amplifier means, adapted to receive an input current having a signal current and repetitive discrete feedback charge pulses, for providing a comparison between the charge arising from the signal current and the total discrete feedback charge, and for producing an output voltage proportional to the difference between the total feedback charge and the total charge produced by the signal current;

b. charge-generating means, connected to the output of the amplifier means, for producing known amounts of charge at a charge output whenever the amplifier means indicates that the feedback charge has a smaller absolute magnitude than the input charge, and for producing at those times frequency output pulses whose repetition rate becomes an output frequency signal; and

c. capacitive-divider means, connected between the charge output of the charge-generating means and the input to

the amplifier means, for attenutating the charge generated by the charge-generating means, to produce said repetitive discrete feedback charge pulses;

whereby, analog-to-digital conversion is accomplished by producing a train of pulses at the frequency output with a repetition frequency related in a known way to the signal current applied to the input of the current-to-frequency converter.

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## 3,921,013
## BIASING CURRENT ATTENUATOR

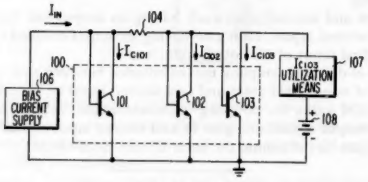
**Adel Abdel Aziz Ahmed, Annandale, N.J., assignor to RCA Corporation, New York, N.Y.**

**Filed Apr. 24, 1974, Ser. No. 463,605**

**Claims priority, application United Kingdom, May 30, 1973, 25881/73**

**Int. Cl.² H03K 1/02**

**U.S. Cl. 307—296** **16 Claims**




**1.** In a biasing arrangement including first and second transistors within an integrated circuit, each of said first and said second transistors having base and emitter electrodes with a base-emitter junction therebetween and having a collector electrode; a first terminal for receiving a reference potential; a second terminal for receiving an operating potential; means for direct current conductively coupling the emitter electrodes of said first and said second transistors to said first terminal; current utilization means connecting the collector electrode of said first transistor to said second terminal; and a node of said integrated circuit direct current coupled to the collector and base electrodes of said second transistor, said node for receiving a bias current; an improved circuit for coupling a portion of said bias current from said node to said first transistor base electrode comprising:

at least one ladder network section having a series arm and a shunt leg, said series arm thereof having a first and a second end which are respectively coupled to said node and the base electrode of said first transistor, said shunt leg thereof having a first and a second ends which are respectively connected to said second end of said series arm and to said first terminal;

a resistive element included in the series arm of each ladder network section;

a semiconductor diode device included in the shunt leg of each ladder network section and within said integrated circuit and poled to be forward biased by the passage of a portion of said bias current therethrough, wherein said semiconductor diode device included in said shunt leg comprises a further transistor having an emitter electrode and a collector electrode connected to separate ones of the first and second ends of said shunt leg, having a base electrode direct coupled to its collector electrode and having a base-emitter junction between its said base and said emitter electrodes; and

first and second further resistive elements connecting the base electrodes of said first transistor and of said further transistor in the preceding said ladder network section, respectively, to the collector electrode of the latter.

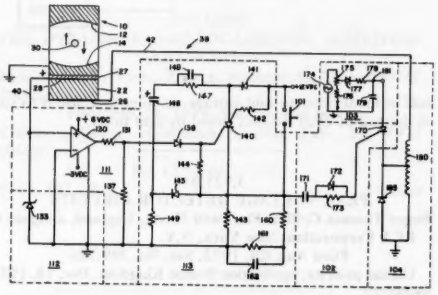
## 3,921,014
## BOUNCE DRIVE SYSTEM

**Theodore D. Jayne, Painesville, Ohio, assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.**

**Continuation-in-part of Ser. No. 749,521, July 26, 1968, Pat. No. 3,882,736. This application Oct. 23, 1973, Ser. No. 406,072**

**Int. Cl.² H01V 7/00**

**U.S. Cl. 310—8.1** **4 Claims**



**1.** A high speed driver comprising:

a first transducer for converting a mechanical impulse to an electrical signal;

a comparator circuit connected to said first transducer for providing a first output signal upon said electrical signal exceeding a predetermined magnitude;

a pulse stretcher circuit connected to said comparator circuit for providing a second output signal for a predetermined period of time upon receipt of said first output signal;

a silicon controlled rectifier circuit connected to said pulse stretcher circuit for providing a third output signal upon receipt of said second output signal;

a bounce rate controller circuit connected to said silicon controlled rectifier circuit for determining the magnitude and duration of said third output signal;

a manual controller connected to said silicon controlled rectifier circuit for providing an enabling signal to said silicon controlled rectifier circuit to enable said rectifier circuit to provide said third output signal;

a second transducer adapted to receive said third output signal for converting said third output signal to a mechanical impulse;

a high voltage circuit connected between said silicon controlled rectifier circuit and said second transducer for increasing the voltage of said third output signal;

said first and second transducers comprised of piezoelectric material;

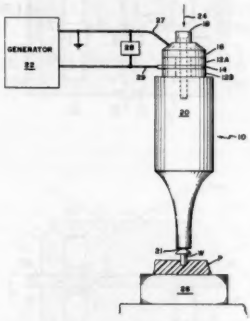
said comparator circuit including a voltage comparator for comparing said electrical signal with a reference signal and providing a positive output signal upon the voltage of said electrical signal exceeding said reference signal and a voltage divider circuit connected to said voltage comparator for providing said first output signal upon receipt of said positive output signal; and

said pulse stretcher circuit including a voltage source and a silicon controlled switch connected to said voltage source and said voltage divider circuit for providing a conduction path for said voltage source to form said second output signal for a predetermined period of time upon receipt of said first output signal.

## 3,921,015
## HIGH VOLTAGE TRANSIENT PROTECTION MEANS AS FOR PIEZOELECTRIC TRANSDUCERS

**Edward G. Obeda, Brookfield, and George C. Kramer, Danbury, both of Conn., assignors to Branson Ultrasonics Corporation, New Canaan, Conn.**

**Filed Aug. 1, 1974, Ser. No. 493,912**
**Int. Cl.² H01L *41/10***
**U.S. Cl. 310—8.1** **10 Claims**




**1.** An ultrasonic converter for use in an insertion apparatus comprising:

piezoelectric wafer means having electrode means, said wafer means providing mechanical high frequency vibration in response to electrical excitation applied to said electrode means;

horn means coupled to said piezoelecric wafer means for transmitting mechanical energy from said piezoelectric means to a workpiece in contact with the front surface of said horn means,

electrical generating means coupled to said electrode means for causing said piezoelectric wafer means and said horn means to be resonant, and

voltage limiting means coupled to said electrode means to suppress high voltage transients across said piezoelectric wafer means resulting from mechanical impact between said front surface and workpiece.

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## 3,921,016
## SONIC SIGNAL GENERATOR AND HOUSING

**David L. Livermore, Seattle; Peter Skelly, Issaquah, and D. Frederic Proctor, Redmond, all of Wash., assignors to Proctor & Associates Company, Redmond, Wash.**

**Filed Dec. 12, 1973, Ser. No. 424,162**
**Int. Cl.² H01L *41/04***
**U.S. Cl. 310—9.1** **30 Claims**

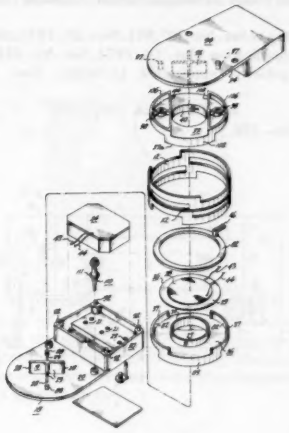
**1.** A sonic signal generator, comprising:

transducer means, including a piezoelectric transducing element mounted on a diaphragm, said transducer means having upper and lower surfaces and operative when energized to produce wave energy off said upper and lower surfaces;

means supporting said transducer means along a nodal path of vibration thereof, said transducer means flexing about said nodal path when energized, said upper surface of said transducer means having first central and first peripheral surface portions defined by said nodal path, and said lower surface of said transducer means having second central and second peripheral surface portions defined by said nodal path;

means for energizing said transducer means such that it flexes about said nodal path; and

housing means surrounding said transducer means, including means routing wave energy from a first one of said first central and first peripheral surface portions and from a second one of said second central and second peripheral surface portions to the atmosphere outside said housing means, sais first and second ones of said first and second central and first and second peripheral surface portions producing in-phase wave energy when said transducing means is energized.



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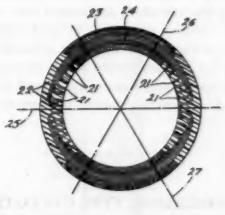
## 3,921,017
## ELECTRIC MOTOR

**Stig Lennart Hallerbäck, Vastra Frolunda, Sweden, assignor to SKF Industrial Trading and Development Company B.V., Jutphaas, Netherlands**

**Filed Feb. 19, 1974, Ser. No. 443,327**
**Claims priority, application Sweden, Mar. 13, 1973, 7303459**
**Int. Cl.² H02K *1/12***
**U.S. Cl. 310—216** **8 Claims**




**1.** Electric poly-phase motor comprising an annular stator assembly having a rotor cavity and a rotor rotatably mounted in the rotor cavity, said stator assembly comprising a plurality of axially directed, magnetically isolated sections each representing an electric phase and each including a plurality of superimposed laminations having side edge portions generally aligned with the axis of the rotor cavity and turned radially inwardly toward the rotor cavity, said side edge portions being circumferentially spaced relative to one another, windings surrounding the yoke portion of the laminations between the turned in side edge portions and a moulding mass encapsulating the laminations and windings and filling the space between the turned in side edge portions except for the outer terminal ends of said side edge portions.

3,921,018

## APPARATUS FOR COOLING ARMATURE END TURNS

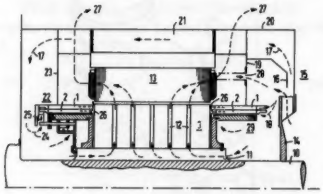
Georg Frankenhauser, Mulheim (Ruhr), Germany, assignor to Kraftwerk Union Aktiengesellschaft, Mulheim (Ruhr), Germany

Continuation of Ser. No. 307,991, Nov. 20, 1972, abandoned. This application Mar. 14, 1974, Ser. No. 451,188

Claims priority, application Germany, Nov. 20, 1971, 2157715

Int. Cl.[2] H02K *3/46, 9/00*

U.S. Cl. 310—270 1 Claim



1. Device for cooling overhang turns of the armature of a polyphase a-c main exciter machine wherein the armature has a laminated core, comprising a plurality of coil rods extending from opposite sides of the armature laminated core, respective pairs of said rods being disposed close to one another in the region of the overhang turns, the coil rods of said respective pairs thereof being mutually spaced at substantially uniform lateral distance, adjacent pairs of said closely disposed coil rods defining cooling channels therebetween, and blower means for passing cooling air through said cooling channels on both said opposite sides of said armature, said pairs of coil rods being disposed in respective upper and lower layers of the overhang turns with an intermediate layer between the pairs of coil rods dividing the pairs of coil rods into said upper and lower layers with cooling channels defined by the adjacent pairs of closely disposed coil rods in the upper layer separated from cooling channels in the lower layer, said intermediate layer extending near to the region bordering the armature laminated core to provide radial channel means located in the region bordering the armature laminated core and communicating with the cooling channels in said upper and lower layers, whereby cooling air is guidable inwardly from an end of the overhang turns in separate flows through the cooling channels in said upper and lower layers and is dischargeable through said radial channel means in direction toward the exciter poles.

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3,921,019

## SELF-SHIELDING TYPE CYCLOTRON

Takashi Karasawa, Tokyo, Japan, assignor to Rikagaku Kenkyusho, Wako, Japan

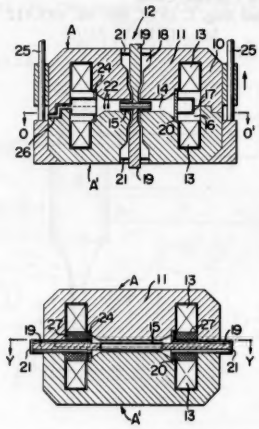
Filed Nov. 21, 1973, Ser. No. 417,929

Claims priority, application Japan, Dec. 4, 1972, 47-123538; Nov. 2, 1973, 48-123629

Int. Cl. H05h *13/00*

U.S. Cl. 313—62 2 Claims

1. A cyclotron comprising: a pair of annular counterpart bodies overlying and integrally assembled with each other, each said annular counterpart body having, in section, a center leg comprising a pole and two side legs comprising a yoke in the form of the letter "E", said yoke having a thickness adequate to prevent radiation from passing therethrough; electromagnet coils positioned around said pole and surrounded by said yoke; dees positioned in the first closed space defined by the opposite end surfaces of said pole; a target box positioned in the second space defined by the opposite surfaces of said electromagnet coils; a resonator comprising coaxial means inserted axially in central apertures of said poles



and integrally connected to said dees; and gas-tight means for keeping vacuum at least in said first closed space.

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3,921,020

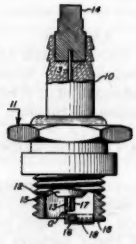
## SPARK PLUG

Bernard Wax, 38 Highland Ave., Succasunna, N.J. 07876

Division of Ser. No. 381,758, July 23, 1973, Pat. No. 3,872,338. This application Nov. 18, 1974, Ser. No. 524,450

Int. Cl.[2] H01T *13/46, 13/20*

U.S. Cl. 313—123 4 Claims



1. A spark plug comprising,

a. a core of insulating material carried by a metal shell,

b. a main electrode carried by said core,

c. a ground electrode connected to said shell and having an end portion spaced from an end portion of the main electrode,

d. a non-conducting ceramic material covering the said end portion of the ground electrode,

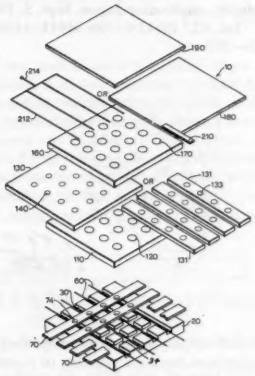
e. a non-conducting ceramic material covering the said end portion of the main electrode, and

f. a neutral electrode covered by a non-conducting ceramic material and positioned between the main and ground electrodes.

## 3,921,021
## DISPLAY PANEL HAVING MEMORY

David Glaser, Green Brook, and George A. Kupsky, Milford, both of N.J., assignors to Burroughs Corporation, Detroit, Mich.

Continuation of Ser. No. 293,384, Sept. 29, 1972, which is a continuation of Ser. No. 38,409, May 18, 1970, abandoned.
This application Mar. 12, 1974, Ser. No. 450,535
Claims priority, application Canada, May 4, 1971, 112107; United Kingdom, May 4, 1971, 12997/71; Germany, May 13, 1971, 2123686; Japan, May 17, 1971, 46-33184; Netherlands, May 17, 1971, 7106719; France, May 18, 1971, 71.17995
Int. Cl.[2] A47B *43/00*; H05B *37/00*
U.S. Cl. 313—188 29 Claims



25. A display device comprising
a gas-filled envelope including
a plurality of first gas-filled cells arrayed in rows and columns,
first electrode means coupled to said first cells for scanning said cells sequentially, either row by row or column by column,
a plurality of second gas-filled cells arrayed in rows and columns spaced from said first cells, with each second cell being in gas communication with a first cell,
an electrode assembly coupled to said second cells including means for applying first signals for transferring glow out of selected ones of said first cells toward the corresponding second cells,
said electrode means also including means for applying second signals to said second cells for transferring said glow into said corresponding second cells and sustaining said glow in said second cells after said first signals have been removed.

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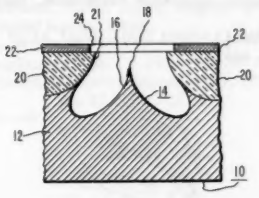
## 3,921,022
## FIELD EMITTING DEVICE AND METHOD OF MAKING SAME

Jules David Levine, East Brunswick, N.J., assignor to RCA Corporation, New York, N.Y.

Filed Sept. 3, 1974, Ser. No. 502,669
Int. Cl.[2] H01J *1/02*
U.S. Cl. 313—309 12 Claims

1. A non-thermionic field emitting device comprising:
a. an electrically conductive substrate having opposed surfaces;
b. at least one field emitting element on said one surface of said substrate, said field emitting element having a



pointed tip which projects away from said substrate; and
c. at least one needle-like projection disposed only on said pointed tip of said field emitting element whereby electron emission is enhanced by convergent lines of force of an electric field.

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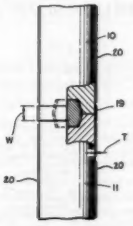
## 3,921,023
## METHOD FOR JOINING CARBON ELECTRODES AND PRODUCT THEREOF

Alexander Yordanov Valchev, and Velyu Todorov Velev, both of Sofia, Bulgaria, assignors to DMZ "LENNIN", Pernik, Bulgaria

Continuation-in-part of Ser. Nos. 56,697, July 20, 1970, and Ser. No. 106,781, Jan. 15, 1971. This application Feb. 5, 1973, Ser. No. 329,815
Claims priority, application Bulgaria, July 21, 1969, 12705
Int. Cl.[2] H01J *1/00*, *17/04*, *19/00*
U.S. Cl. 313—357 3 Claims



1. A method of joining cylindrical carbon electrodes for arc furnaces comprising the steps of applying protective metal coating layer with an aluminum content higher than 65% to each of the electrodes to be joined, joining and fastening two such electrodes aligned end-to-end, and within an arc furnace depositing a layer of a second metal with an aluminum content higher than 60% by spraying in a molten state on the coating of both joined electrodes and on the joint between them in such a way that the deposited layer of said second metal forms an electrically conductive bridge between the protective coating layers on both aligned electrodes.

## 3,921,024
## COLOR SELECTION ELECTRODE MOUNT WITH COATING OF DUCTILE METAL

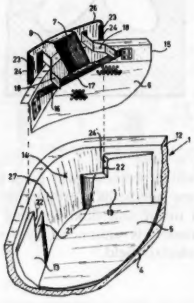
**Gijsbertus Bakker, and Johannes Henricus Nicolaas Gijrath, both of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.**

**Filed May 30, 1974, Ser. No. 474,586**

**Claims priority, application Netherlands, June 14, 1973, 7308243**

**Int. Cl.[2] H01J** *29/02, 29/07, 31/20*

**U.S. Cl. 313—404** **5 Claims**



1. A color television display tube having a cup-shaped glass window including a plurality of recessed portions in its inner side wall, a color selection electrode, a plurality of elongate suspension members of resilient material, one end of each suspension member being secured to the selection electrode and the projecting opposite end thereof being provded with a transverse clamping member of a resilient metal, each clamping member having contact surfaces abutting against the facing sides surfaces of the assigned recessed portion and a layer of a ductile metal deposited between said resilient metal contact surfaces and said glass side surfaces.

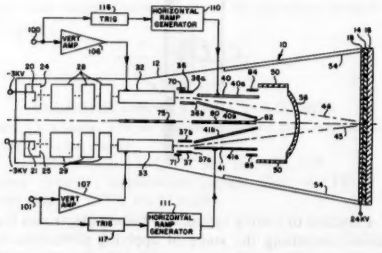
## 3,921,025
## DUAL-BEAM CRT WITH VERTICAL TRACE BOWING CORRECTION MEANS

**Conrad John Odenthal, Portland, Oreg., assignor to Tektronix, Inc., Beaverton, Oreg.**

**Filed July 5, 1974, Ser. No. 486,022**

**Int. Cl.[2] H01J** *29/50, 29/74, 29/70*

**U.S. Cl. 313—437** **9 Claims**



1. An electron beam apparatus comprising:

an evacuated envelope having target means;

dual electron gun means disposed side by side in said envelope on each side of a central axis of said envelope and spaced from said target means for generating electron beams therefrom; and

deflection means for each of said dual electron gun means disposed between said electron gun means and said target means for deflecting said electron beams over said target means in accordance with signal voltages applied thereto to provide image displays thereover;

said deflection means including beam centering means for directing said electron beams toward said central axis of said envelope so that the electrical center of said deflection means corresponds to the center of said target means, said beam centering means including correction means for correcting vertical trace bowing of said image displays.

## 3,921,026
## SOLID STATE DISPLAY APPARATUS

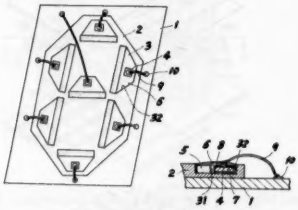
**Kenichi Konishi, Kyoto, and Shohei Fujiwara, Takatsuki, both of Japan, assignors to Matsushita Electronics Corporation, Kadoma, Japan**

**Filed Aug. 20, 1973, Ser. No. 389,513**

**Claims priority, application Japan, Sept. 5, 1972, 47-89267**

**Int. Cl.[2] H01J** *63/06;* **H01L** *33/00*

**U.S. Cl. 313—501** **4 Claims**



1. A solid-state display apparatus comprising an electrically conductive substrate having a plurality of recesses in one face thereof, and an insulating substrate on which said conductive substrate is supported, an infrared-emitting diode having electrodes thereon positioned in and secured to the bottom of each of said recesses, one of said electrodes being electrically connected to said bottom, a luminescent stick containing infrared-excitable luminescent material and light-conductive resin positioned in each recess at a position spaced from said infrared-emitting diode, a transparent light-conductive resin wafer in each of said recesses extending from said diode to said luminescent stick and having a flat bottom face, flat side faces and a flat upper surface, said bottom face and said upper surface being parallel to each other, and surrounding said infrared-emitting diode and said luminescent stick and for conducting and reflecting infrared emissions from the diode to the luminescent stick by total reflection, said sticks being positioned on said substrate in a pattern for indicating a desired configuration when lit, a plurality of connecting tabs on said insulating substrate, one for each recess, and a wire connecting the other electrode of each of said infrared-emitting diodes to a corresponding connecting tab.

## 3,921,027
## MICROWAVE BEAM TUBE

**Joe Shelton, 700 Tatom St. NW., Huntsville, Ala. 35805; Jerry W. Hagood, 307 Mountain Gap Road SE., Huntsville, Ala. 35803, and Ralph L. Norman, 3644 Marymont Drive NW., Huntsville, Ala. 35810**

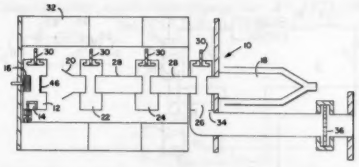
**Filed Sept. 13, 1974, Ser. No. 505,827**

**Int. Cl.[2] H01J** *25/10*

**U.S. Cl. 315—5.39** **1 Claim**

1. In a microwave beam tube having an electron collector and a series of resonant cavities coaxially aligned for coupling an electron beam sequentially therethrough for obtaining velocity modulated output energy therefrom, the improvement of an input cavity electron emission system for providing periodic bunches of electrons emitted into the beam path and

comprising: an input cavity resonator coaxially aligned with said resonant cavities and having an input loop for receiving alternating microwave input signals; a field effect electron emitter disposed for periodically releasing electrons into said input cavity toward said collector in response to said alternating microwave energy developed within said cavity, said emitter comprising a plurality of parallel, insulated, emitting fibers per unit area having a conductive backing plate in common with one wall of said input cavity, said plurality of insulated



emitting fibers are several million parallel fibers per square centimeter forming a planar emitting surface for emitting electrons at prevailing ambient temperatures; an accelerating electrode, said accelerating electrode being coaxially aligned between said input cavity and a first cavity of said coaxial resonant cavities for developing an electric field between the emitter and electrode for directing electron beam flow from said emitter therethrough; and an electron drift space separating each of said coaxial resonant cavities from adjacent of said cavities.

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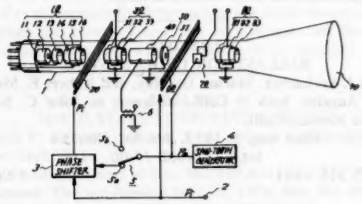
**3,921,028**

## DEVICE FOR OBSERVING WAVEFORM OF MICROWAVE SIGNAL

**Kazuo Fujisawa, Ikeda, Japan, assignor to Osaka University, Osaka, Japan**

**Filed Mar. 14, 1974, Ser. No. 451,031**
**Int. Cl.[2] H01J** *29/98, 29/70, 23/16*
**U.S. Cl. 315—9** **6 Claims**



1. A device for observing the waveform of a microwave signal comprising a source of said microwave signal, means producing a continuous electron beam, first beam deflecting means, means producing a first waveform signal synchronous with the microwave signal to be observed, means connecting the last said means with said first deflecting means for deflecting said beam (in one plane), shutter means positioned forwardly of said first deflecting means for permitting said beam to pass when said deflection is within predetermined limits thereby producing a pulsed electron beam, second beam deflecting means following said shutter means for deflecting said beam (in said plane), a second means producing a second waveform signal in the form of and synchronous with said microwave signal, means producing a third waveform signal, phase shifting means for varying the phase between said first and second waveform signals with respect to said electron beam and under control of said third waveform signal, means applying said second waveform signal to said second beam deflecting means, display means in the path of and responsive to said beam for displaying the movement of said beam wherein the deflection produced by said second deflecting means occurs along the phenomenon axis and means for sweeping said beam in synchronism with said third waveform signal.

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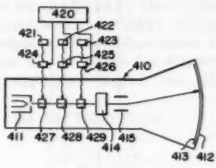
**3,921,029**

## COLOR IMAGE DISPLAYING DEVICE

**Masakazu Hashiue, Asaka, Japan, assignor to Fuji Shashin Film Kabushiki Kaisha, Japan**

**Continuation of Ser. No. 183,568, Sept. 24, 1971, abandoned.**
**This application Sept. 17, 1973, Ser. No. 397,869**
**Claims priority, application Japan, Oct. 1, 1970, 45-86243**
**Int. Cl.[2] H01J** *29/52*
**U.S. Cl. 315—30** **3 Claims**



1. A color image vacuum tube display apparatus, comprising:
- electron beam generating means for generating one electron beam;
- a plurality of monocrystal films disposed in series in the path of said one electron beam;
- a plurality of light sources for generating coherent light beams;
- modulating means for modulating said coherent light beams;
- means coupled to said modulating means for generating a modulating signal, said coherent light beams being modulated as a function of said modulating signal, the modulated light beams impinging on corresponding ones of said monocrystal films to modulate said electron beam;
- a face disposed in the path of said modulated electron beam to produce an image on a polycrystal film having a color which is determined by the modulated coherent light beams impinging on said monocrystal films; and
- deflection means for scanning said modulated electron beams over said face plate.

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**3,921,030**

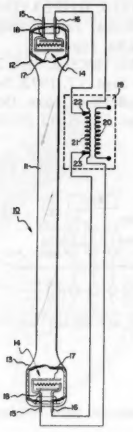
## RADIATION STANDARD

**Peter D. Johnson, Schenectady, N.Y., assignor to General Electric Company, Schenectady, N.Y.**

**Filed Feb. 22, 1972, Ser. No. 227,941The portion of the term of this patent subsequent to July 25, 1989, has been disclaimed.**
**Int. Cl.[2] H01J** *61/12*
**U.S. Cl. 315—94** **6 Claims**

1. A reference standard of emission of 1849 A.U. UV radiation emitting a uniform intensity of 1849 A.U. radiation under varying operating conditions and comprising
- a. an evacuable discharge envelope including as a radiating portion thereof a UV transmissive section of restricted diameter;
- b. a gaseous filling within said envelope of a noble gas within the range of 1–20 Torr;
- c. a quantity of mercury within said envelope sufficient upon the attainment of lamp operating conditions to provide a steady state partial pressure of mercury within said envelope within the range of 0.025 to 0.25 Torr;
- d. a pair of arc electrodes dispersed at electrical ends of said discharge envelopes and adapted to sustain therebetween an electric discharge within said envelope; and
- e. means electrically coupled with said electrodes for con-

trolling said electrical discharge to maintain said discharge at a current density within the range of 0.5 to 3.0



amperes/cm², and establish therein an operating temperature within the range of 45°–90°C.

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**3,921,031**

**ELECTROEMISSIVE COMPONENT**

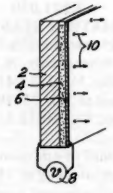
**Jacques Emile Dubois; Pierre Camille Lacaze, both of Paris; Claude Le Gressus, Fontenay Le Fleury, and Daniel Massignon, Paris, all of France, assignors to Commissariat A L'Energie Atomique & Agence Nationale De Valorisation De La Recherche Anvar, Paris, France**

**Filed Jan. 23, 1974, Ser. No. 435,666**

**Claims priority, application France, Jan. 30, 1973, 73.03212**

**Int. Cl.² H01J *1/14***

**U.S. Cl. 315—94** **4 Claims**



**1.** An electroemissive component having variable emissivity, wherein said component is constituted by a conductive substrate on which at least one continuous film of a solid organometallic compound having a thickness within the range of a few Angstrom to a few hundred Angstrom has been deposited by electrochemical process, and by a conductive deposit formed by at least one thin film and deposited on said organometallic film, said substrate and said conductive deposit being electrically connected respectively to the two poles of a variable-voltage source which controls the emissivity.

**3,921,032**

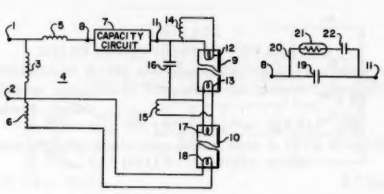
**THERMAL REGULATOR BALLAST**

**Alexander Robert Hallay, Danville, Ill., assignor to General Electric Company, Indianapolis, Ind.**

**Continuation-in-part of Ser. No. 412,167, Nov. 2, 1973, abandoned. This application Feb. 10, 1975, Ser. No. 548,433**

**Int. Cl.² H05B *41/36***

**U.S. Cl. 315—106** **15 Claims**




**12.** A ballast circuit for regulating the current to at least one gaseous discharge lamp over a range of ambient temperatures comprising: a pair of input terminals for connecting said ballast circuit to a source of power;

a transformer having primary and secondary windings, said primary winding being connected to said pair of input terminals;

means for connecting said ballast circuit across the at least one lamp;

a power capacity circuit connected between said secondary winding of said transformer and said means for connecting said ballast circuit to the at least one lamp; said power capacity circuit including means adapted to substantially change the effective capacitance of said power capacity circuit in response to a predetermined change in the temperature to which said ballast circuit is subjected for substantially changing the overall impedance of said ballast circuit so that said ballast circuit is thermally regulated with no more than an insubstantial change in light output of the at least one lamp.

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**3,921,033**

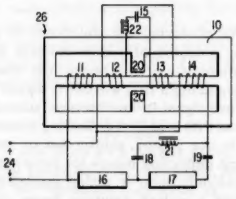
**BALLAST FOR LIGHT SYSTEM**

**Robert I. Sarbacher, Marina Del Ray, and Robert E. Mauch, Los Angeles, both of Calif., assignors to John C. Bogue, Santa Monica, Calif.**

**Filed Aug. 8, 1973, Ser. No. 386,584**

**Int. Cl.² H06B *17/00***

**U.S. Cl. 315—141** **7 Claims**



**1.** A ballast for fluorescent lamps comprising:

first means for supplying proper fluorescent lamp operating current at a given frequency, said first means including a transformer core member, a magnetic shunt integral with said core member, first and second windings wound on said core in such a manner that said first and second windings form an autotransformer having a primary winding and a secondary winding, and first and second capacitors coupled to said secondary winding; and

second means operatively associated with said first means for so modifying the operation of said first means that said

first means is capable of also providing a proper fluorescent lamp operating current at a frequency higher than said given frequency.

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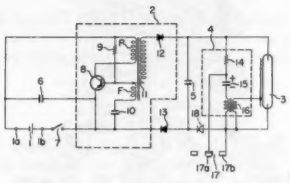
## 3,921,034
## STROBOSCOPIC DEVICE WITH ELECTRIC SHOCK PREVENTIVE CIRCUIT

**Zenzo Nakamura, Urawa, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan**

**Filed Dec. 23, 1974, Ser. No. 535,818**
**Claims priority, application Japan, Dec. 27, 1973, 48-4238**
**Int. Cl.² H05B** *41/32*
**U.S. Cl. 315—241 P** **4 Claims**



1. A stroboscopic device comprising:
a. a power source,
b. a flash discharge tube electrically connected in parallel to said power source,
c. trigger circuit means for triggering said flash discharge tube, said trigger circuit means including a capacitor which is charged by said power source,
d. a pair of sync contacts connected to first and second terminals of said capacitor, said capacitor being actuated or discharged when said pair of sync contacts are closed, and
e. unidirection current control means inserted between one of the terminals of said power source and one of said pair of sync contacts for interrupting the short circuit current when the other of said pair of contacts and the other terminal of said power source are short circuited.

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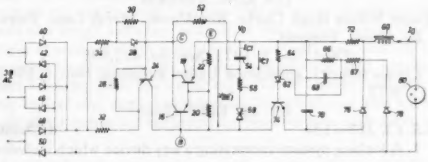
## 3,921,035
## SOLID STATE SWITCHING CIRCUIT

**Kenneth P. Holmes, Houston, Tex., assignor to Esquire, Inc., New York, N.Y.**

**Continuation-in-part of Ser. No. 433,834, Jan. 15, 1974, abandoned. This application July 18, 1974, Ser. No. 489,527**
**Int. Cl.² H05B** *41/231*; **G05F** *1/08*
**U.S. Cl. 315—307** **109 Claims**



1. A regulating ballast circuit for a high intensity discharge lamp, comprising
dc voltage input means,
switching circuit means connected to said input means including means exhibiting high gain over a wide range of operating currents and having a first load resistance, and variable current means regeneratively connected thereto having a second load resistance, the ratio of said first and second load resistances determining the turn-off current gain of said switching circuit,
turn-on means connected to said switching circuit for generating a turn-on input thereto dependent in time on the level of output from said dc voltage means when said switching circuit is in the off condition,
turn-off means connected to said switching circuit for generating a turn-off input thereto dependent in time on the instantaneous level of the operating current when said switching circuit is in the turned on condition, and
inductor means for maintaining current through the lamp connected to said switching circuit, the effective current therethrough being approximately constant independent of the frequency of turn on and turn off of said switching circuit.

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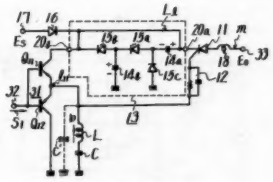
## 3,921,036
## ELECTRON BEAM DEFLECTION CIRCUIT

**Minoru Morio, Kamakura, and Yutaka Nakagawa, Tokyo, both of Japan, assignors to Sony Corporation, Tokyo, Japan**

**Filed Jan. 11, 1974, Ser. No. 432,609**
**Claims priority, application Japan, Jan. 19, 1973, 48-8817[U]**
**Int. Cl.² H01J** *29/72*
**U.S. Cl. 315—396** **8 Claims**



1. A deflection circuit comprising:
a. an output circuit including a pair of transistors connected in a single-ended push-pull amplifier array and a deflection coil connected to the output end of said pair of transistors, said deflection coil being supplied with a deflection current in trace and retrace periods;
b. a voltage terminal provided to be connected to a voltage source;
c. switch means connected to said voltage terminal;
d. circuit means having charge storing means and connected between one end of said output circuit and said switch, said circuit means supplying a first voltage to said output circuit and simultaneously charging said charge storing means during the retrace period and supplying a second voltage lower than said first voltage to said output circuit by the discharging of said charge storing means during the trace period; and
e. control means for controlling the conductivity of said switch means in response to the turning of the period between the trace and retrace periods.

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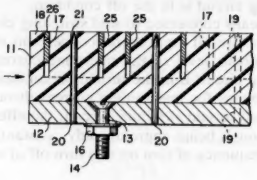
## 3,921,037
## MOVING WEB ENERGIZED STATIC ELIMINATOR AND METHOD

**Anthony Q. Testone, P. O. Box 414, Lee, Mass. 01238**

**Filed May 16, 1974, Ser. No. 470,700**
**Int. Cl.² H05F** *3/00*
**U.S. Cl. 317—2 F** **13 Claims**

1. Apparatus for reducing the static electricity charge in a moving web of material comprising:
electrically conductive plate means for defining a capacitor with said moving web,
means for causing said conductive plate means to be electrically floating, whereby said plate means is free of connection to ground and to electric potential source means, and

grounded electrically conductive means for causing with said plate means ionization of air adjacent said web including a point in capacitive relationship with said plate means.



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**3,921,038**

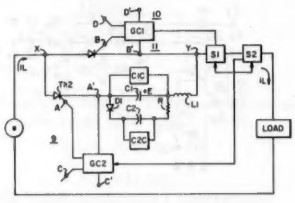
**STATIC SURGE-CURRENT LIMITER**

**Andress Kernick, Murrysville; John Rosa, Pittsburgh, both of Pa., and David L. Bowles, Lima, Ohio, assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.**

**Filed Feb. 19, 1974, Ser. No. 443,875**

**Int. Cl.² H02H 7/10**

**U.S. Cl. 317—33 SC** **14 Claims**



**1.** A current limiting device, comprising:

A. terminals adapted to be connected in circuit relationship in an electrical system with a load and a source of voltage;

B. main circuit means disposed between said terminals for conducting electrical current in said electrical system;

C. commutating circuit means connected between said terminals generally in parallel circuit relationship with said main circuit means, said commutating circuit means comprising:

1. controllable switch means which is actuated to conduct at least a portion of said current in said electrical system when said current flowing in said electrical system attains a predetermined condition;

2. blocking and current limiting means connected in circuit relationship with said controllable switch means for causing said main circuit means to cease to conduct after said controllable switch means has been actuated to thereby cause said commutating current means to conduct substantially all of said current in said electrical system and to limit said current;

3. supplemental capacitive current limiting means connected in circuit relationship with said blocking means and said controllable switch means for further limiting said electrical current in said system;

4. generally passive diode means connected in circuit relationship with said current limiting means said controllable switch means and said blocking means, said passive diode means being forward biased by said blocking means in response to a predetermined amount of said system current flowing in said blocking means after said blocking means has caused said main circuit to cease to conduct to thereby cause said supplemental current limiting means to conduct a significant portion of said current in said electrical system to thereby limit said current in said system to a predetermined maximum value.

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**3,921,039**

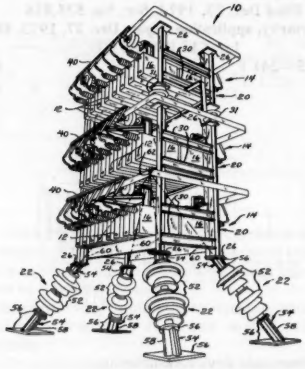
**SEISMIC RESISTANT STRUCTURE FOR A CAPACITOR BANK**

**Arthur R. Robinson; David A. W. Pecknold, both of Urbana, and William Hamilton Walker, Champaign, all of Ill., assignors to Sangamo Electric Company, Springfield, Ill.**

**Filed Mar. 1, 1974, Ser. No. 447,148**

**Int. Cl.² H02B 1/04**

**U.S. Cl. 317—103** **4 Claims**



**1.** A capacitor stack including at least one horizontally disposed box-like structural support frame which securely supports a plurality of capacitors, a plurality of support means supporting said support frame on a generally flat base surface, each of said support means including an elongated ceramic insulator section, and a first and a second metal adaptor means, said first adaptor means attaching one end of said insulator section to a bottom portion of said horizontally disposed support frame, and said second adaptor means attaching the opposite end of said insulator section to said flat base surface, each of said support means being located at each of the four corners of said support frame and being oriented in a direction which extends generally downwardly and outwardly from the bottom portion of said support frame in a splayed relationship thereto, said first and second adaptor means of each support means aligning and corresponding insulator section so that the longitudinal axis of the insulator section is coincident with a centerline or line of action for each one of said support means, which is directed toward and in close proximity to the center of gravity of said capacitor stack.

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**3,921,040**

**LOCKING SYSTEM**

**Walter Wilson Hugh Clarke, Brooklands, Marsh Lane, Eversley, Hants, England**

**Filed Nov. 2, 1973, Ser. No. 412,095**

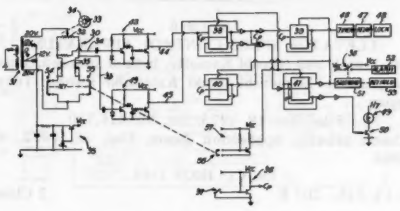
**Claims priority, application United Kingdom, Nov. 6, 1972, 51179/72**

**Int. Cl.² E05B 49/00**

**U.S. Cl. 317—134** **4 Claims**

**1.** A locking system comprising a key device which includes at least one impedance, key receiving means, circuitry in which said at least one impedance can be connected by associating said key with said key receiving means, said circuitry including at least one variable impedance, manually operable means for setting the value or values of said at least one variable impedance, a locking device, means for releasing the locking device when said at least one variable impedance has been correctly set to a value or plurality of values having a predetermined relationship with the value or values of the at least one impedance in the key device when the key device is associated with the key receiving means, including alarm

means, said circuitry being adapted to energise the alarm means in response to an incorrect setting, and wherein the circuitry is adapted to energise the alarm means in response



only to the last of a plurality of incorrect settings, whereby to permit at least one incorrect attempt at releasing the locking device to be made without energising the alarm means.

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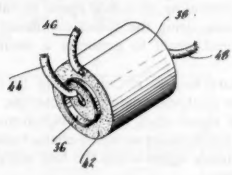
**3,921,041**

## DUAL CAPACITOR

**Robert M. Stockman, Brookfield Center, Conn., assignor to American Radionic Co., Inc., Danbury, Conn.**

**Filed Feb. 24, 1975, Ser. No. 552,552**
**Int. Cl.² H01G** *4/32*
**U.S. Cl. 317—260** **10 Claims**



**1.** The method of making a dual metallized film capacitor which comprises: providing a supply of a first dielectric film strip metallized on one side thereof; providing a supply of a second dielectric film strip metallized on one side thereof; winding said first and second strips in substantially cylindrical form with the non-metallized sides of each strip in contact with the metallized side of the other strip, the metallized edge of said first strip being exposed at one end of said cylindrical form and the metallized edge of said second strip being exposed at the other end of said cylindrical form; removing the metallized layer from said first strip over a region intermediate the ends of said first strip; inserting between said region and said second strip a sheet of insulating material positioned to extend outwardly from said one end of said cylindrical form and of a length sufficient to encircle the circumference of said form at said region at least once; continuing said winding for a predetermined length of film; terminating said winding; metal coating each end of the capacitor so formed; and securing to said one end of said form a first electrical lead within said sheet and a second electrical lead without said sheet.

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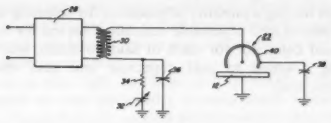
**3,921,042**

## ELECTROSTATIC REPRODUCTION MACHINE WITH IMPROVED CORONA GENERATING DEVICE

**Vittal U. Shenoy, Rochester, N.Y., assignor to Xerox Corporation, Stamford, Conn.**

**Filed Nov. 25, 1974, Ser. No. 527,112**
**Int. Cl.² H01T** *19/00*
**U.S. Cl. 317—262 A** **3 Claims**

**1.** An improved electrostatic reproduction machine having means including a transfer station and a stripping station for producing a copy of an original document, the improvement comprising a DC biased AC corona generating device having a metal shield, and means for grounding the metal shield, the



grounding means including means for allowing AC current to be grounded while simuntaneously blocking DC current.

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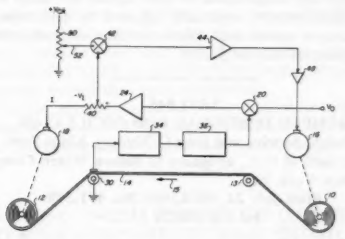
**3,921,043**

## METHOD AND APPARATUS FOR MAINTAINING SUBSTANTIALLY CONSTANT TORQUE IN A WEB TRANSPORT APPARATUS

**Guillermo F. Luzio, Webster, N.Y., assignor to Xerox Corporation, Stamford, Conn.**

**Filed Dec. 14, 1973, Ser. No. 425,054**
**Int. Cl.² B65H** *77/00*
**U.S. Cl. 318—7** **13 Claims**



**1.** A method of maintaining substantially constant the torque output of a first motor driving a first reel, a web being transported between a second reel and said first reel comprising the steps of:

driving said web from said second reel to said first reel,

generating a voltage signal directly proportional to the current drawn by said first motor,

comparing said voltage signal with a reference voltage and generating a signal representing the difference therebetween, said reference voltage corresponding to a predetermined torque output produced by said first motor,

converting said difference signal to a reverse biasing current, and

applying said reverse biasing current to a second motor mechanically coupled to said second reel to thereby provide a reverse torque to said second motor whereby tension is exc.ted on said web to maintain the torque output of said first motor substantially constant.

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**3,921,044**

## ELECTRICAL DENTAL MALLET

**Robert C. McShirley, 6535 San Fernando Road, Glendale, Calif. 91201**

**Division of Ser. No. 244,487, April 17, 1972. This application Jan. 2, 1974, Ser. No. 429,542**
**Int. Cl.² H02K** *33/00*
**U.S. Cl. 318—114** **5 Claims**

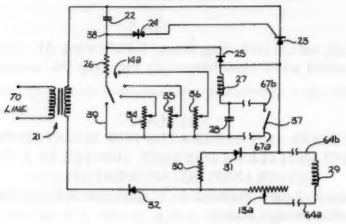
**1.** In an electrically driven dental mallet, a control unit for generating electrical signals for driving such mallet in reciprocating motion comprising:

a controlled rectifier coupled to such mallet, said controlled rectifier including a control terminal;

a capacitor coupled to said control terminal of said controlled rectifier;

a plurality of adjustable resistance means;

a switch having a plurality of positions for selecting a different one of said adjustable resistance means for coupling to said capacitor for each of said positions, said switch being coupled to said capacitor and said resistance means; and,




amplitude control means for controlling the amplitude of said electrical signals coupled to such mallet and said controller rectifier;

whereby the frequencies of said signals for each switch position, may be separately adjusted by said adjustable resistance means such that a plurality of predetermined frequencies may be preset.

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**3,921,045**

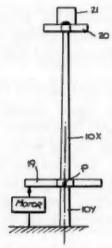
**DAMPED TORSIONAL ROD OSCILLATOR**

**Stanley Reich, Jericho, and John C. Murray, Kings Park, Long Island, both of N.Y., assignors to Bulova Watch Company, Inc., New York, N.Y.**

**Filed July 24, 1974, Ser. No. 491,398**

**Int. Cl.² H02K** *33/12*

**U.S. Cl. 318—127** **6 Claims**




1. A torsional oscillator adapted to be driven by a periodic signal derived from an external generator, said oscillator comprising:

A. an erect torsion rod anchored at its base, said rod having a natural resonance frequency subject to change,

B. a load element mounted on the free end of the rod and swinging therewith, and

C. a motor driving said rod to sustain it in oscillation, said motor including an armature secured to the rod at a point adjacent said base and an electromagnet associated with said armature to produce in response to said periodic drive signal a torque to excite said rod into oscillations at the natural resonance frequency thereof, the section of said rod below said point having a spring constant which closely approaches the spring constant of the section above said point to produce a coupling between said sections acting to dampen said oscillator and to broaden its mechanical bandwidth, whereby the oscillator continues to function efficiently should the periodicity of the signal deviate from the natural frequency of the rod or the natural frequency of the rod deviate from the frequency of the drive signal.

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**3,921,046**

**ELEVATOR SPEED CONTROL APPARATUS**

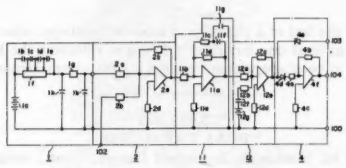
**Nobuo Anzai, and Hiroshi Kamaike, both of Inazawa, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan**

**Filed Dec. 18, 1973, Ser. No. 425,720**

**Claims priority, application Japan, Dec. 18, 1972, 47-126904**

**Int. Cl.² H02P** *1/40*

**U.S. Cl. 318—203 R** **2 Claims**



1. Apparatus for controlling an elevator cage driven through an induction motor comprising:

means for generating a speed command signal;

means for generating an actual speed signal,

means for comparing the speed command signal and the actual speed signal to generate a resultant difference signal;

a delay characteristic circuit having first switch means therein for applying a delay characteristic to the resultant difference signal when the first switch means is in a first state and for applying no delay characteristic to the resultant difference signal when the first switch means is in a second state;

a saturation signal generating circuit having its input connected to the output of the delay characteristic circuit and having second switch means therein for generating a saturation signal to be applied to a distribution circuit when the second switch means is in a first state and for applying the output of the delay characteristic circuit to the distribution circuit when the second switch means is in a second state,

the first switch means being switched from its first state to its second state at a given deceleration decision point and being switched from its second state to its first state upon reaching a deceleration command point,

the second switch means being switched from its second state to its first state after the end of acceleration and being switched from its first state to its second state at the beginning of deceleration.

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**3,921,047**

**OVERSPEED PROTECTION SYSTEM FOR CENTRIFUGE APPARATUS**

**Alan W. Carter, Newark, and Robert C. Franklin, Los Gatos, both of Calif., assignors to Beckman Instruments, Inc., Fullerton, Calif.**

**Filed Apr. 2, 1973, Ser. No. 347,355**

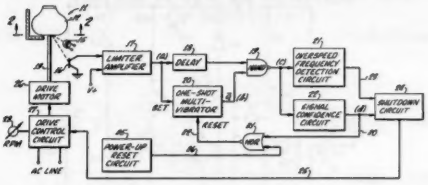
**Int. Cl.² H02P** *3/06*

**U.S. Cl. 318—313** **13 Claims**

1. In an overspeed protection system for a centrifuge apparatus including a rotor driven by a drive motor; transducer means including a coded disk having a plurality of spaced sectors secured to said rotor and a detector assembly responsive to rotation of said disk for generating a signal for each waveform whose frequency is a function of the rotational speed of said rotor; and means coupled to the output of said transducer means and responsive the frequency of said peri-

odic waveform for sensing an overspeed condition of said rotor, the improvement comprising:

means coupled to the output of said transducer means during start up and inoperable after a given time interval




therafter, said means responsive to the time duration of said signals from said detector assembly for generating a power shutdown command for said drive motor unless the time duration of at least one of said signals during said interval is greater than a predetermined minimum value.

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**3,921,048**

## SOLID STATE CONTROL FOR HOSPITAL BED MOTORS

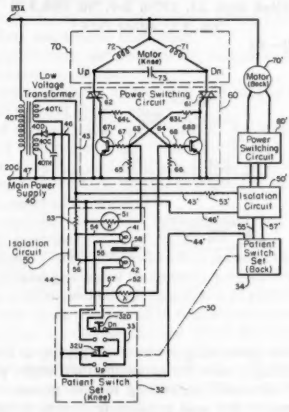
**Kenneth W. Padgitt, Arlington Heights, Ill., assignor to Borg-Warner Corporation, Chicago, Ill.**

**Continuation of Ser. No. 187,725, Oct. 8, 1971, abandoned. This application July 18, 1973, Ser. No. 380,310**

*Disclosure was also published under Trial Voluntary Protest Program on Jan. 28, 1975.*

**Int. Cl.[2] H02P** *7/74*

**U.S. Cl. 318—480** **1 Claim**




**1.** In an adjustable motorized hospital bed of the type having articulated panels positioned by at least one reversible electric motor having forward and reverse winding coils, a solid state control system for controlling the application of a relatively high voltage a.c. mains to the winding coils to effect rotation of the motor in either clockwise or counterclockwise direction, comprising:

first and second triacs each having first and second main terminals and a gate terminal;

a first series circuit, including the forward winding coil and the first and second main terminals of said first triac, coupled across the a.c. mains;

a second series circuit, including the reverse winding coil and the first and second main terminals of said second triac, coupled across the a.c. mains;

a first voltage divider, including a first photosensitive element, coupled to the gate terminal of said first triac and normally applying to that gate terminal a voltage of an amplitude insufficient to turn said first triac ON and render it conductive;

a second voltage divider, including a second photosensitive element, coupled to the gate terminal of said second triac and normally applying to that gate terminal a voltage of an amplitude insufficient to turn said second triac ON and render it conductive;

first and second light emitters each of which is optically coupled to, but electrically isolated from, a respective one of said first and second photosensitive elements;

a source of relatively low voltage;

a hand-held, patient operated control unit having first and second manually actuated switches each of which, when actuated, couples said low voltage source to a respective one of said light emitters to effect illumination thereof,

the resistance of said first photosensitive element decreasing in response to the illumination of said first light emitter to effect an increase in the voltage applied to the gate terminal of said first triac thereby turning the first triac ON and coupling the high voltage a.c. mains to the forward winding coil to cause the motor to rotate in the clockwise direction,

the resistance of said second photosensitive element decreasing in response to the illumination of said second light emitter to effect an increase in the voltage applied to the gate terminal of said second triac thereby turning the second triac ON and coupling the high voltlage a.c. mains to the reverse winding coil to cause the motor to rotate in the counterclockwise direction;

means, operable when said first photosensitive element is activated by light from said first light emitter, for preventing said second triac from conducting;

and means, operable when said second photosensitive element is activated by light from said second light emitter, for preventing said first triac from conducting.

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**3,921,049**

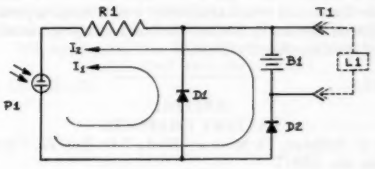
## CHARGING CIRCUIT FOR BATTERY-OPERATED DEVICES POWERED BY SOLAR CELLS

**Geoffrey W. Mellors, Strongsville; Robert A. Powers, Lakewood, and Glenn W. Sheffield, Strongsville, all of Ohio, assignors to Union Carbide Corporation, New York, N.Y.**

**Filed Sept. 25, 1973, Ser. No. 400,656**

**Int. Cl.[2] H02J** *7/00*; **G04C** *3/00*

**U.S. Cl. 320—2** **9 Claims**




**1.** A charging circuit for battery-operated devices powered by a photovoltaic battery comprising a photovoltaic battery having positive and negative terminals; resistive means connected in series to said photovoltaic battery; first diode means connected in parallel across said series-connected photovoltaic battery and resistive means so as to provide a first conductive circuit loop for said photovoltaic battery; second diode means connected in series to a rechargeable battery having positive and negative terminals; said rechargeable battery and second diode means connected in parallel across both the first diode means and the series-connected photovoltaic battery and resistive means; said photovoltaic battery and resistive means connected in terminal relationship with the rechargeable battery and second diode means so as to provide a second conductive circuit loop in which the photovoltaic battery will charge said rechargeable battery while said second diode

means will prevent reverse current flow through said photovoltaic battery when the voltage of said rechargeable battery exceeds the voltage of said photovoltaic battery; said first diode means providing in said first conductive circuit loop a path so as to prevent excessively high current flow from said photovoltaic battery through said rechargeable battery; and output terminals connected across said rechargeable battery and adapted for coupling to a battery-powered device.

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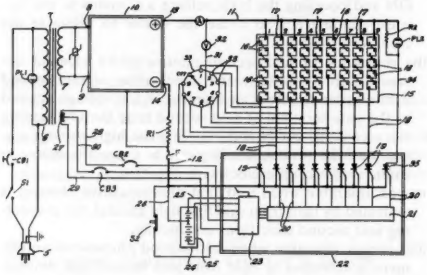
**3,921,050**
**PROGRAMMED BATTERY CHARGING SYSTEM**
**Clifford A. Rowas, Cincinnati, Ohio, assignor to Schauer Manufacturing Corporation, Cincinnati, Ohio**
**Filed Oct. 2, 1974, Ser. No. 511,318**
**Int. Cl.[2] H02J** *7/00*
**U.S. Cl. 320—19** **3 Claims**



**1.** In a programmed battery charging system the combination of a fully regulated, constant current boost charging circuit, a plurality of banks, each bank having a number of series connected batteries therein, a conductor connecting each bank of batteries to the charging circuit, a series of first switches each interposed in a conductor, a stand-by circuit connected across the charging circuit, a visible indicator means and a second switch interposed in series in the stand-by circuit, and a continuously operable sequence control means adapted to progressively actuate and disconnect each first switch to boost charge successive banks of batteries, then actuate the second switch to monitor a non-charging period of the system and finally initiate the boost charging circuit following the non-charging period.

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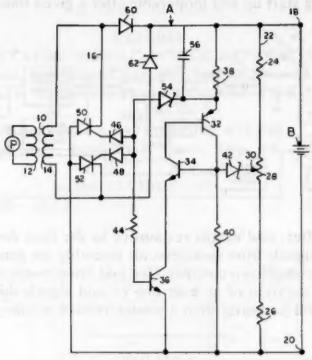
**3,921,051**
**BATTERY CHARGERS**
**Gray C. Ballman, 22 Mercury Blvd., P.O. Box 22, Chesterfield, Mo. 63017**
**Filed Jan. 30, 1975, Ser. No. 545,589**
**Int. Cl.[2] H02J** *7/10*
**U.S. Cl. 320—39** **3 Claims**

**1.** A battery charger for use in remote areas comprising a continuous source of alternating power, positive and negative output terminals across which a battery is connected, a voltage divider circuit across said output terminals and provided with a selectively variable voltage tap, rectifying means for converting the AC power to DC charging power and provided such DC power to said output terminals from said AC power source, first switching means for monitoring the voltage across the output terminals and including first and second transistors regeneratively coupled to each other, said first switching means being adapted for placing said first and second transistors in conduction when the voltage derived at the voltage tap attains a preselected magnitude, said first and second transistors being normally non-conducting, cutoff means for interrupting the flow of charging power when the first and second transistors are in conduction, and second switching means for interrupting at regular intervals the conduction of the first and



second transistors whereby to provide a constant monitoring of the battery voltage.

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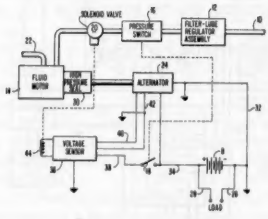
**3,921,052**
**FLUID AUTOCHARGING SYSTEM**
**Blaise L. Milano, River Ridge, La., assignor to Gen-Star, Inc., La.**
**Filed Sept. 23, 1974, Ser. No. 508,539**
**Int. Cl.[2] H02J** *7/14*
**U.S. Cl. 320—61** **8 Claims**

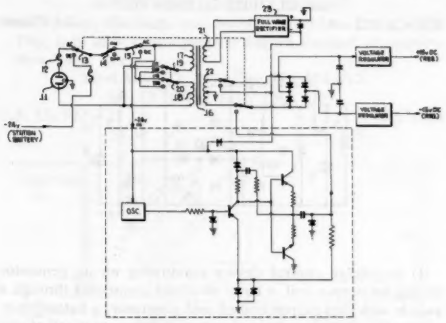


**1.** A power generating system comprising a fluid motor, means including a valve for supplying fluid under pressure to said motor, electrical generating means, means connecting said fluid motor and said generating means for driving the latter when fluid is supplied to said fluid motor to generate electricity, a battery, means coupling said battery and said electrical generating means for supplying the generated electricity to said battery to charge the same, means coupled to said battery including a sensor responsive to a battery voltage above a predetermined first voltage for closing said valve to interrupt the supply of fluid to said fluid motor thereby interrupting the generation of electricity and the charging of said battery, said sensor being responsive to a voltage below a predetermined second voltage for opening said valve and providing fluid to said fluid motor thereby to reestablish the generation of electricity and the charging of said battery, and means carried by said fluid supply means and electrically coupled between said battery on the one hand and said generating means and said sensor on the other hand for electrically decoupling said generating means and said sensor from said battery in response to curtailment of fluid from said fluid supply means to preclude power drain-off from said battery to said sensing unit and said electrical generating means.

## 3,921,053
## DC-TO-DC CONVERTER

Norris C. Hekimian, Rockville, Md., assignor to Hekimian Laboratories, Inc., Rockville, Md.

Filed Aug. 14, 1974, Ser. No. 497,460
Int. Cl.[2] H02M 3/335
U.S. Cl. 321—2 10 Claims



1. A DC-to-DC converter responsive to a primary DC voltage of a first polarity for providing an output voltage at the opposite polarity, said converter comprising:

first and second complementary transistors, each having a base, an emitter and a collector;

control means for providing a gating signal alternating between two amplitude levels;

means connecting said gating signal to the base of each of said first and second transistors;

means connecting said primary DC voltage to the collector of said first transistor;

means connecting the collector of said second transistor to circuit ground;

first and second resistors of relatively low resistance connected together at a first circuit junction;

means connecting said first and second resistors in series between the emitters of said first and second transistors; a second circuit junction;

a first capacitor connected between said first and second circuit junctions;

a first diode connected between said second circuit junction and ground and poled to conduct current when the voltage at said second circuit junction is of said first polarity; a second diode connected to said second circuit junction and poled to conduct current when the voltage at said second circuit junction is at said opposite polarity;

a second capacitor connected between said second diode and circuit ground to be charged by current conducted through said second diode;

circuit means for biasing said first and second transistor such that each transistor, when conducting, is in the region of saturation;

wherein said circuit means includes:

a third diode;

a third capacitor;

a third resistor;

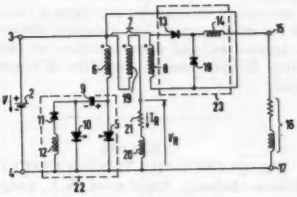
means connecting said third diode and third capacitor in series between said primary DC voltage and said first circuit junction, said third diode being poled to conduct current flowing between said primary DC voltage and ground through said third capacitor and the collector-emitter circuit of said second transistor;

means connecting said third resistor between the base of said first transistor and a circuit junction between said third diode and third capacitor to permit discharge of said third capacitor through said third resistor and the base-emitter circuit of said first transistor when said first transistor is in the conducting state.

## 3,921,054
## APPARATUS FOR CONVERTING D.C. VOLTAGE

Harald Heinicke, Erlangen, Germany, assignor to Siemens Aktiengesellschaft, Munich, Germany

Filed Sept. 12, 1974, Ser. No. 505,261
Claims priority, application Germany, Sept. 27, 1973, 2348622
Int. Cl.[2] H02P 13/20
U.S. Cl. 321—2 2 Claims



1. Apparatus for converting the D.C. level of a constant voltage source having a negative and positive terminal comprising

a transformer having a primary coil, a secondary coil, and a magnetization reversing coil

switching means,

rectifying means,

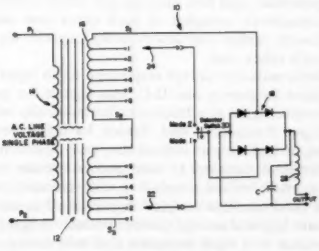
where the primary coil in series with the switching means is connected in parallel across the constant voltage source, one side of the secondary coil is connected to the positive terminal of the constant voltage source and the other side is connected to the rectifying means,

the magnetization reversing coil is connected between the positive terminal of the constant voltage source and a series connected limiting resistor and choke inductor connected to the constant voltage source negative terminal, said magnetization reversing coil connected so that current flowing in it is in a direction opposite to that flowing in the primary coil.

## 3,921,055
## WELDING POWER SUPPLY HAVING DUAL OUTPUT TRANSFORMER

William Franklin Dorsey, Florence, S.C., assignor to Union Carbide Corporation, New York, N.Y.

Continuation of Ser. No. 299,098, Oct. 19, 1972, abandoned. This application Dec. 20, 1973, Ser. No. 426,560
Int. Cl.[2] B23K 9/08; H01F 29/02
U.S. Cl. 321—24 4 Claims



4. A single phase dual output welding transformer structure comprising:

a fixed ferromagnetic core structure having a first and second outer leg and a third leg located substantially intermediate said first and second legs, each leg being substantially equal in cross-sectional area and length;

a primary winding wound on said first leg and adapted to be connected to a source of alternating current;

a secondary winding have a first and second section connected in series to one another with said first section being wound on said first leg in close coupling to said primary winding and with said second section being wound on said second leg;

at least one means of insulting material located between the second and third leg of said structure for limiting the passage of flux through said second leg;

a first plurality of output taps located on said first section of said secondary winding for providing a plurality of constant potential outputs; and a second plurality of output taps located on said second section of said secondary winding for providing a plurality of constant current outputs.

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## 3,921,056
## FREQUENCY MULTIPLIER CIRCUIT

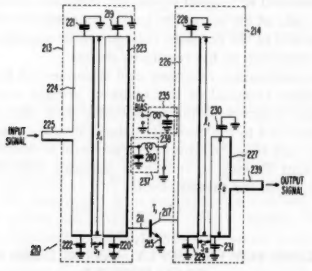
**Donald Edwin Mahoney, Hightstown, N.J., assignor to RCA Corporation, New York, N.Y.**

**Filed Dec. 27, 1973, Ser. No. 428,795**

*Disclosure was also published under Trial Voluntary Protest Program on Jan. 28, 1975.*

**Int. Cl.² H02M 5/16**

**U.S. Cl. 321—69 NL** **12 Claims**




1. A frequency multiplier comprising:

first, second, third and fourth transmission line center conductors each having means for capacitively coupling opposite center conductors ends to a common reference potential, said first and second center conductors being capacitively coupled to each other and said third and fourth center conductors being capacitively coupled to each other; and

a semiconductor device responsive to an input signal at an input frequency and D.C. bias signals for generating an output signal at a frequency harmonically related to said input frequency, said device having a predetermined input and output impedance, said device having a first terminal coupled to said second center conductor, a second terminal coupled to said reference potential and a third terminal coupled to said third center conductor, said first and second center conductors being arranged to match said input impedance of said device at said input frequency, said third and fourth center conductors being mutually arranged to match said output impedance of said device at said desired signal frequency with said third conductor providing a relatively low impedance path to said reference potential at said input frequency and said fourth center conductor being resonant at said desired signal frequency.

## 3,921,057
## DEVICE FOR CONTROLLING OUTPUT VOLTAGE OF AC MAGNETO GENERATOR

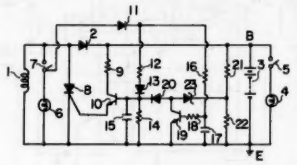
**Keigo Naoi, and Hiroshi Koike, both of Katsuta, Japan, assignors to Hitachi, Ltd., Japan**

**Filed Sept. 26, 1973, Ser. No. 400,740**

**Claims priority, application Japan, Sept. 29, 1972, 47-97042**

**Int. Cl.² H02J 7/; H02P 9/13**

**U.S. Cl. 322—8** **14 Claims**



1. A voltage control device comprising an ac generator having an output coil, a lamp as a load connected through a switch with said output coil of said generator, a battery connected through a rectifying circuit with said output coil of said generator, a thyristor connected with the output terminals of said generator, and a control circuit to control said thyristor, wherein said control circuit has two voltage detecting means, the first of which detects the terminal voltage of said battery and the second of which detects the voltage applied to said lamp, and wherein said thyristor is controlled by the signal from said second voltage detecting means when said switch is closed and by the signal from said first voltage detecting means when said switch is open.

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## 3,921,058
## DEVICE FOR COMPENSATING AC POWER SOURCE VOLTAGE

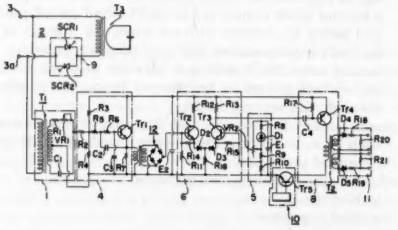
**Masaru Tanaka, Toyonaka; Takeshi Oku, Kawanishi, and Yoshimitsu Matsumoto, Toyonaka, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan**

**Continuation of Ser. No. 298,284, Oct. 17, 1972, abandoned. This application Jan. 23, 1974, Ser. No. 435,949**

**Claims priority, application Japan, Oct. 19, 1971, 46-82685**

**Int. Cl.² B23K 9/06; G05F 1/56**

**U.S. Cl. 323—19** **3 Claims**



1. Device for compensating AC power source voltage comprising:

a. a phase controlled rectifier connected in series to the primary circuit of a power source transformer;

b. a power source voltage detector composed of a filter including RC elements and a transistor for blocking transmission of high frequencies and a phase shifter;

c. a comparator connected to compare the detected voltage of said power source voltage detector and the reference voltage; and

d. means for controlling the effective terminal voltage of the primary circuit of said power source transformer by con-

trolling the conduction phase of said phase controlled rectifier in correspondence to the timing when said detected voltage becomes equal to said reference voltage.

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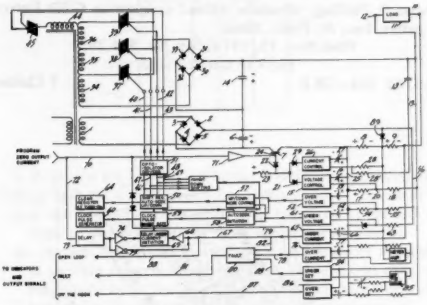
## 3,921,059
## POWER SUPPLY INCORPORATING, IN SERIES, A STEPPED SOURCE AND A FINELY REGULATED SOURCE OF DIRECT CURRENT

**Paul Birman, Flushing, and Sarkis Nercessian, Long Island City, both of N.Y., assignors to Forbro Design Corporation, New York, N.Y.**

**Filed Mar. 22, 1974, Ser. No. 454,012**
**Int. Cl.² G05F** *1/58, 1/62, 1/64*
**U.S. Cl. 323—21** **10 Claims**



**1.** In a regulated power dc supply, the combination of;
a first power supply including series regulating means;
a second power supply;
circuit means connecting said two power supplies in series aiding mode to a pair of output terminals;
feedback means for controlling said series regulating means to provide a predetermined regulated voltage or current to said output terminals;
means for sensing the voltage contributed by said first power supply to the total voltage across said terminals;
means for incrementing said second power supply in discrete steps both to increase or to decrease the voltage contributed by it to the combined voltage across said load terminals;
and means for actuating said incrementing means of said second power supply to increase its contribution when said sensed voltage is greater than a predetermined voltage and to decrease its contribution when said sensed voltage is less than a predetermined voltage.

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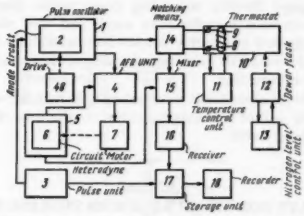
## 3,921,060
## VHF-BAND PULSE RADIOSPECTROMETER FOR THE STUDY OF NUCLEAR QUADRUPOLE RESONANCE IN SOLID SPECIMENS

**Ivan Alexandrovich Ekimovskikh, ulitsa Lenina, 23, kv. 21, and Boris Grigorievich Ignatov, ulitsa Lenina, 26, kv. 22, both of Fryazino Moskovskoi oblasti, U.S.S.R.**

**Filed Mar. 4, 1974, Ser. No. 447,772**
**Int. Cl.² G01N** *27/00*
**U.S. Cl. 324—0.5 A** **2 Claims**

**1.** A VHF-band pulse radiospectrometer for the study of nuclear quadrupole resonance in solid specimens, comprising: a high-frequency pulse oscillator; a pulse unit connected to the input of said oscillator; and anode circuit in said oscillator; a retuning element for said anode circuit; an inductance coil for accommodating investigated solid specimens and being electrically connected to said oscillator; means for matching the resistance of said coil with that of said anode circuit, effecting electric coupling of said coil to said oscillator; a superheterodyne receiver for receiving nuclear quadrupole resonance signals of the investigated specimens; a mixer for said receiver, whose one input is connected to the output of said matching means; an IF amplifier in said receiver, the input thereof being connected to the output of said mixer; a variable-frequency oscillator with a circuit for said receiver, whose first output is connected to the other input of said mixer; a retuning element for said variable oscillator circuit; and automatic frequency retuning unit for said variable oscillator, one input thereof being connected to the output of said




pulse oscillator, and the other input thereof being connected to the output of said variable oscillator; means for recording the resonance signals, whose input is connected to the output of said IF amplifier; an electric motor, electrically coupled to the output of said automatic frequency retuning unit and mechanically coupled to said element for retuning the variable oscillator circuit; drive means, mechanically coupled to said retuning element of the anode circuit; and controlled thermostatic means for lodging the investigated solid specimens; wherein said retuning elements are variable capacitors.

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## 3,921,061
## ELECTRODE ASSEMBLY FOR DOWNHOLE ELECTRIC WELL LOGGING

**Dale E. Miller, Ponca City, Okla., assignor to Continental Oil Company, Ponca City, Okla.**

**Division of Ser. No. 335,436, Feb. 23, 1973, Pat. No. 3,838,335. This application Apr. 11, 1974, Ser. No. 460,035**
**Int. Cl.² G01V** *3/18*
**U.S. Cl. 324—10** **3 Claims**

**2.** An electrode assembly for use in downhole electrical well logging in combination with a conventional well logging cable or the like including a longitudinal strength member and a plurality of logging cable conductors, comprising:
a first elongated electrode comprising:
flexible elongated longitudinal strength member means having opposite ends for engagement with the strength member of a well logging cable;
a plurality of flexible elongated conductor means each having opposite ends and disposed about said strength member means for electrically connecting to the respective logging cable conductors;

means at each end of said strength member means for securing said strength member means to the strength member of the well logging cable;

means at each end of each of said elongated conductor means for electrically connecting each end of each of said conductor means to a respective conductor of the well logging cable;

an elongated substantially cylindrical metallic wire mesh disposed around said elongated strength member means and said plurality of elongated conductor means;

elongated flexible insulating core means disposed between said metallic wire mesh and said plurality of elongated conductor means for electrically insulating said wire mesh from said plurality of elongated conductor means; and

means for electrically connecting said metallic wire mesh with one of the logging cable conductors of the well logging cable.

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**3,921,062**

## CIRCUIT FOR MEASURING AND STORING PEAK VALUES OF IGNITION VOLTAGE IN AN INTERNAL COMBUSTION ENGINE

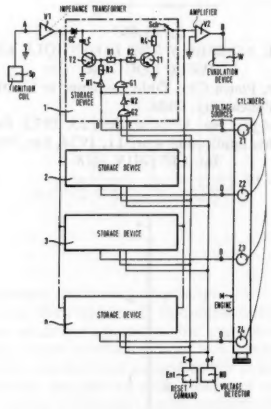
**Klaus Roland Kuhn, and Viktor Stigler, both of Karlsruhe, Germany, assignors to Siemens Aktiengesellschaft, Munich, Germany**

**Filed July 8, 1974, Ser. No. 486,644**

**Claims priority, application Germany, July 12, 1973, 2335539**

**Int. Cl.[2] G01R** *13/42, 23/00, 29/00*

**U.S. Cl. 324—16 R** **7 Claims**




1. A circuit for storing peak ignition voltage values in an internal combustion engine comprising

a. a plurality of capacitors all having one electrode coupled in parallel to an ignition voltage source;

b. a plurality of first switching transistors coupling said one electrode of corresponding ones of said capacitors to ground through their collector emitter path;

c. an equal plurality of reesistors between said electrodes and said first switching transistors;

d. an evaluator unit;

e. A plurality of switches coupling said respective one terminals to said evaluator unit;

f. a plurality of second switching transistors coupling the respective other terminals of said capacitors to ground;

g. a plurality of second and third resistors coupling the bases of respective ones of said first and second switching transistors;

h. means for providing a plurality of signals one associated with each individual cylinder of the engine, said plurality of signals being coupled to the bases of the respective second switching transistors and as control inputs to respective ones of said switches;

i. a plurality of logic elements each having an output coupled to the junction of a respective second and third resistors, and each having as a first input a respective output of said means providing a plurality of signals; and

j. means for providing a reset signal, said means having its output coupled as second input to all of said plurality of logic elements.

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**3,921,063**

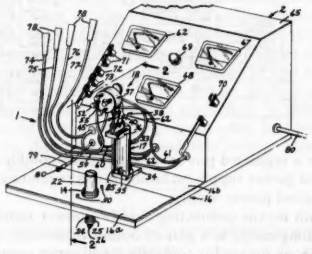
## TEST STAND FOR SOLENOID SWITCHES

**Oscar D. Helling, Mankato, Minn., assignor to GTO Enterprises, Inc., St. Peter, Minn.**

**Filed Nov. 15, 1974, Ser. No. 524,252**

**Int. Cl.[2] G01R** *31/02*

**U.S. Cl. 324—28 R** **7 Claims**



1. A test stand for electrically functioning and testing a solenoid switch of the type having an electrical coil surrounding an armature recess, a mechanically actuated switch within the armature recess and a plurality of protruding terminal posts connectable to electrical leads, comprising:

a. a support platform engageable with the solenoid switch for holding it in a test position;

b. an armature core movably attached to said support platform, said armature core slidable within the armature recess from an inactive first position to an energized second position wherein it contacts the mechanically actuated switch;

c. biasing means attached to said armature core for urging it into said first position, said biasing means allowing the armature core to move to said second position when the electrical coil is energized;

d. a terminal head positionable adjacent the solenoid switch terminal posts for interconnecting the electrical leads with the terminal posts;

e. positioning means attached to said support member and to said terminal head for positioning the terminal head adjacent the solenoid switch;

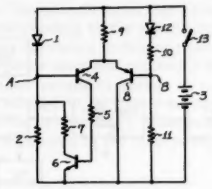
f. movable contact elements attached to said terminal head, said contact elements each having a first end connectable to the electrical leads and a second end abuttable against the solenoid switch terminal posts; and

g. attachment means for movably attaching said contact elements to said terminal head with the contact elements abuttable against each of the solenoid switch terminal posts when the terminal head is positioned adjacent the solenoid switch.

## 3,921,064
## POWER SOURCE CHECKER DEVICE

**Chiharu Mori, and Masahiro Kawasaki, both of Tokyo, Japan, assignors to Asahi Kogaku Kogyo Kabushiki Kaisha, Tokyo, Japan**

**Filed Apr. 17, 1974, Ser. No. 461,598**
**Claims priority, application Japan, Apr. 26, 1973, 48-51049[U]**
**Int. Cl.² G01N 27/42**
**U.S. Cl. 324—29.5** **1 Claim**



1. A device for checking whether a power source terminal voltage exceeds a minimum requirement, which comprises:
first and second current flow paths arranged in parallel to draw respective currents from the power source;
the current flow paths including circuit elements arranged to provide reference and detection voltages that differ in magnitude by at least a predetermined amount when the terminal voltage exceeds the minimum requirement;
a luminescent diode serving as one of the circuit elements, the diode being connected in the first current flow path so as to be forward biased and to have the reference voltage developed across it;
the diode also serving as a controllable visual indicator, the diode lighting up when there is current flowing through it in excess of a threshold value;
comparison circuit means having a first input connected to respond to the reference voltage developed across the diode, a second input connected to respond to the detection voltage, and an output for producing a positive feedback control signal when the reference and detection voltages differ by at least the predetermined amount; and
switching circuit means responsive to the positive feedback control signal for closing a positive feedback loop so as to increase both the current flowing through the diode and the reference voltage developed across it.

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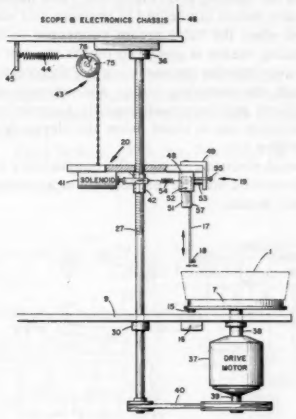
## 3,921,065
## MAGNETIC SENSOR FOR DETECTING FLAWS ON ONE SURFACE OF ROLLER BEARING

**Wendell G. Rawlins, 1563 Belle, Topeka, Kans. 66604; Gary M. Hoffsommer, R.F.D. No. 1, Quenemo, Kans. 66528; Charles W. Artzer, 631 Freeman, Topeka, Kans. 66616, and Cecil H. Parrett, 925 N.E. 43rd Road, Topeka, Kans. 66617**

**Filed Feb. 15, 1974, Ser. No. 442,880**
**Int. Cl.² G01R 33/12**
**U.S. Cl. 324—37** **5 Claims**

1. Apparatus for detecting flaws in a surface of a large roller bearing having an inner race, a cage spaced apart form and concentric about the inner race, and a plurality of rollers connected to the cage and abutting the outer surface of the inner race, comprising:
a. a probe including a sensor facing towards and in contact with the outer surface of the inner race, said sensor including means for providing a magnetic field having magnetic lines of force in a loop about said sensor and the inner race, said sensor having an inductive reactance which is proportional to the number of magnetic lines of force in the loop;
b. first means for moving said probe with respect to the roller bearing to enable said sensor to be positioned between the outer surface of the inner race and the cage;
c. second means for automatically moving said sensor vertically across the outer surface of the inner race including a motor connected to said probe, means for providing a signal corresponding to the vertical position of said probe, means connected to said providing means for energizing said motor when said probe is at a first vertical position with respect to the roller bearing, and means connected to said providing means for deenergizing said




motor when said probe is at a second vertical position with respect to the roller bearing lower than the first vertical position;
d. means for rotating the roller bearing about a vertical axis, including said motor;
e. means for determining a change in inductive reactance of said sensor when said sensor moves across a flaw in the outer surface of the inner race providing an air gap between said sensor and the outer surface; and
f. means connected to said determining means, for displaying information corresponding to the condition of the outer surface.

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## 3,921,066
## BLOOD TEST DEVICE AND METHOD

**Henry Robert Angel, and James William Hennessy, both of Trumbull, Conn., assignors to Angel Engineering Corporation, Stratford, Conn.**

**Filed Feb. 25, 1974, Ser. No. 445,123**
**Int. Cl.² G01N 27/00, 33/16**
**U.S. Cl. 324—71 CP** **14 Claims**

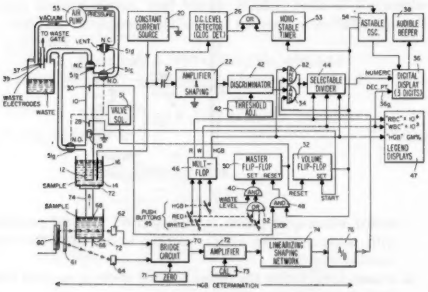
1. A volumetric particle counter for counting relatively non-conductive particles in a fixed volume of relatively conductive liquid test solution comprising
a vertically oriented conductivity cell of insulating material having a metering orifice, an internal cavity providing a fixed volume between first and second levels within said cavity the volume between said first and second levels providing a measure of known volume of test solution, a suction connection on said cell communication with said cavity above the second level, a pressure connection on said cell communicating with said cavity above the second level, and a discharge passage from said cell communicating with said cavity below the first level,
a support frame for supporting said conductivity cell,
an open top beaker for containing a test solution containing particles to be counted,

a platform movably supported on said support frame by elevator means to raise and lower said platform so that said beaker in the raised position places said test solution containing particles to be counted in fluid communication with said cell cavity through said orifice,

vacuum producing means and gas pressure producing means on said support frame,

separate valve means, respectively, connecting said suction connection to said vacuum producing means, connecting said pressure connection to said gas pressure producing means and connecting said discharge passage to waste, and each valve means having selectably positionable means for opening and closing said valve means, whereby the valve means connected to pressure and waste may be closed when the valve means connected to the vacuum producing means is opend to permit the test solution to be drawn into the internal cavity of the conductivity cell through the metering orifice and whereby these valve conditions may be simultaneously reversed to urge the test solution out to waste below the electrodes but above the orifice,

an external electrode outside the conductivity cell in position to extend into the test solution in a container on said support means,



an internal electrode inside the cavity of the conductivity cell,

a counter circuit, into which said first internal and external electrodes are connected and which is completed by conductive liquid test solution between said electrodes, to count each pulse occurring as the result of variation in impedance of the circuit which occurs as a particle in the test solution passes through the orifice thereby reducing the conductive cross-section area of said orifice,

first and second control electrodes positioned at said first and second levels within said cavity to sense when the test solution reaches, respectively, said first and second predetermined levels in said cavity,

counter selection means connected to said first and second internal control electrodes and connected to the counter circuit to permit output of a selected count only when the test solution reaches said first level and terminating said selected count when the test solution reaches said second level, said selected count being representative of counted particles within said known volume, and

count display means responsive to the output of the counter means and displaying a particle count proportioned to the count for said fixed volume.

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**3,921,067**

## STRAY ENERGY DETECTION CIRCUIT

**Arthur N. Mernone, Indianapolis, Ind., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.**

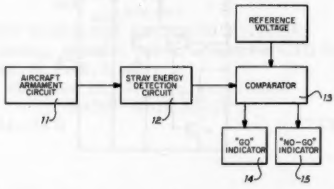
**Filed June 24, 1974, Ser. No. 482,391**
**Int. Cl.² G01R 31/02**
**U.S. Cl. 324—72** **5 Claims**

1. An energy detection circuit for determining an unacceptable limit of stray energy in an armament firing circuit comprising,

a resistive load connectable with an armament firing circuit,

a first amplifier having an output and an input connected to said resistive load,

a feedback circuit including a rectifying circuit connected between said output and said input of said first amplifier, said rectifying circuit being comprised of first, second, third, and fourth barrier type diodes connected in a bridge circuit having first and second terminals connected with said first amplifier and having third and fourth output terminals,




means in said feedback circuit for providing gain to said first amplifier proportional to the stray AC energy in said armament firing circuit,

a second amplifier having inputs connected to said rectifying circuit and having a single ended output,

a source of reference voltage, and

a comparator circuit connected to said output of said second amplifier and to said reference voltage source and providing an indicating output when said voltage output of said second amplifier is greater than said reference voltage.

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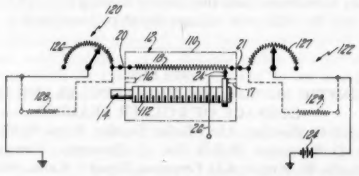
**3,921,068**

## INDICATING POTENTIOMETER

**John G. Gamble, Simsbury, and Allan R. Ames, Weatogue, both of Conn., assignors to Veeder Industries, Inc., Hartford, Conn.**

**Filed June 10, 1974, Ser. No. 477,701**
**Int. Cl.² G01R 17/00; H02P 9/00**
**U.S. Cl. 324—98** **8 Claims**




1. An indicating potentiometer comprising a bidirectional potentiometer having a housing, electrical resistance means within the housing, a pair of separate electrical conductor leads connected to opposite ends of the electrical resistance means, a single bidirectional potentiometer tap within the housing, an electrical conductor lead connected to the potentiometer tap, the potentiometer tap being adjustable along the electrical resistance means for establishing a potentiometer control voltage, a single bidirectional rotor operatively connected to the potentiometer tap and adjustable in each angular direction between high and low limit positions thereof, establishing the potentiometer range, for adjusting the potentiometer tap along the electrical resistance means, and potentiometer stop means, mounted within the potentiometer hous-

ing, establishing the high and low limit positions of the rotor and therefore the potentiometer range; a bidirectional multiple wheel rotary readout counter comprising a plurality of coaxial bidirectional rotary counter wheels of ascending order and transfer means between adjacent order counter wheels for bidirectionally transferring counts from each adjacent lower order counter wheel to the adjacent higher order counter wheel and counter drive means operatively connecting the lowest order rotary counter wheel of the multiple wheel rotary readout counter to the potentiometer rotor for rotation of the lowest order counter wheel in opposite angular directions therewith for presenting a predetermined multiple wheel visual readout of the potentiometer tap setting through a readout range corresponding to the potentiometer range, and a pair of auxiliary resistance means respectively connected to said pair of separate electrical conductor leads in series with the potentiometer resistance means to provide a resultant series circuit adapted to be connected across an electrical supply voltage for establishing a predetermined control voltage range corresponding to the predetermined readout range of the counter.

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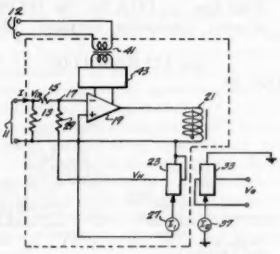
## 3,921,069
## VARIABLE GAIN ELECTRONIC CURRENT TRANSFORMER

**Miran Milkovic, Scotia, N.Y., assignor to General Electric Company, Schenectady, N.Y.**

**Filed Nov. 6, 1974, Ser. No. 521,300**
**Int. Cl.[2] G01R** *21/08, 7/12*
**U.S. Cl. 324—107** **10 Claims**



1. An apparatus for metering active electrical energy in a polyphase three-line system comprising:

means for measuring current in at least two of said lines, each of said current measuring means including means for sensing the current flow through said line, operational amplifier means for amplifying said sensed current, a first source of variable current, means responsive to the output of said variable current source and said amplifier for generating a feedback voltage having a magnitude which is proportional to the product of the output of said variable current source and the output of said amplifier, said feedback voltage being coupled to the input of said operational amplifier, a second source of variable current, means responsive to the output of said operational amplifier and said second current source for generating an output voltage, said output voltage being proportional to said sensed voltage and being directly variable in accordance with the output of said second current source and inversely variable in accordance with said first current source, means for measuring two different line voltages, means coupled with said current measuring means for producing a first plurality of two analog signals representing the currents measured in the two lines, means coupled with the voltage measuring means for producing a second plurality of at least two analog signals representing the different line voltages, means for pairing different ones of the current analog signals of the first plurality with different ones of voltage analog signals of the second plurality such that the different pairs representative of the instantaneous power in different parts of said polyphase system, means coupled with said pairing means for converting each of the pairs of analog signals to a different one of a series of consecutive signals, each signal in each of the series representing instantaneous power in a different part of said system, means coupled with said last-mentioned conversion means for converting said signals in said series of consecutive signals to a signal representing average power in the system, an analog to pulse rate converter for converting said average power signal to an output pulse train having a frequency which is proportional to the magnitude of said average power signal, and means for recording said pulse trains.

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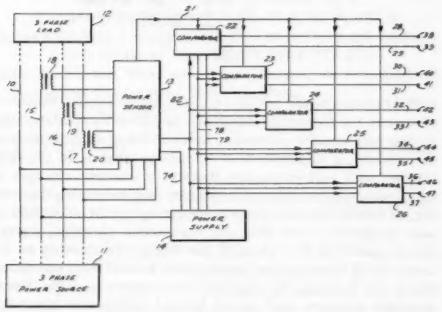
## 3,921,070
## ELECTRICAL POWER MONITOR

**Ralph H. Ringstad, Whippany, and James M. Daley, Bayonne, both of N.J., assignors to Automatic Switch Company, Florham Park, N.J.**

**Filed Sept. 1, 1972, Ser. No. 285,776**
**Int. Cl.[2] G01R** *21/06*
**U.S. Cl. 324—142** **10 Claims**



1. A monitor for determining the real electrical power being delivered by an A.C. line to a load, comprising:

a. means for providing a D.C. signal which is proportional to the product of A.C. line current, the corresponding A.C. line voltage, and the cosine of the phase difference between said line current and line voltage,

b. means for providing a reference voltage which corresponds to a particular level of power being delivered by the A.C. source, and

c. means for comparing the D.C. signal with said reference voltage and for providing a binary signal in response thereto, the binary signal indicating whether the magnitude of the D.C. signal is less than or greater than the reference voltage, thereby indicating whether the A.C. power being delivered to the load is less than or greater than said particular power level.

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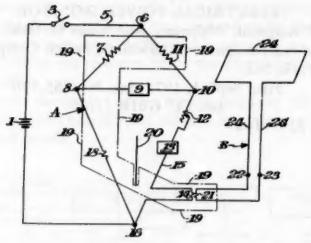
## 3,921,071
## HAZARD ASSESSMENT PROBE CIRCUIT

**Florian B. Janoski, Allentown, Pa., assignor to Atlas Powder Company, Wilmington, Del.**

**Filed Aug. 30, 1974, Ser. No. 501,890**
**Int. Cl.[2] G01R** *5/22, 21/04*
**U.S. Cl. 324—158 R** **14 Claims**

1. A hazard assessment probe circuit for measuring the effective current introduced into an electro-explosive device bridgewire by extraneous electricity, including but not limited to radio frequency energy, intercepted by external circuit wiring connected to the electro-explosive device comprising a bridge circuit, first and second branches in the bridge circuit, a self-contained power supply for said circuit, a null detector

directly connected between the first and second branches to indicate the balance status of the bridge circuit, a fixed resistor in each of the bridge branches, said resistors being matched resistors, a compensating thermistor in the first branch that responds only to ambient temperature within the temperature stabilizing block, a measuring thermistor in the second branch of the bridge circuit responsive to heat generated by extraneous electrical energy, said thermistors being matched thermistors and subject to the same ambient temperature during operation wherein the resistance values thereof vary with temperature but which remain closely similar in magnitude for any given ambient temperature, a variable resistance element in the second branch of said bridge circuit for adjusting the resistance of said second branch to obtain



initial balance of the bridge and to compensate for resistance change in the measuring thermistor and thereby rebalance the bridge, said variable resistance unit providing an indication of the resistance adjustment, a bridgewire that is in physical contact with said measuring thermistor whereby changes in bridgewire temperature are sensed by said measuring thermistor, an extraneous electricity intercepting circuit connected to said bridgewire such that any extraneous electrical energy intercepted will flow through the bridgewire causing an increase in its temperature, an insulated temperature stabilizing block for housing the matched thermistors and the fixed, matched resistors, and means housed within said block for indicating the temperature of the temperature stabilizing block.

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## 3,921,072
## SELF-ADAPTIVE EQUALIZER FOR MULTILEVEL DATA TRANSMISSION ACCORDING TO CORRELATION ENCODING

**Yoichi Sato, Tokyo, Japan, assignor to Nippon Electric Company, Ltd., Tokyo, Japan**

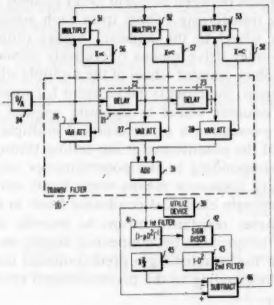
**Filed Mar. 18, 1974, Ser. No. 452,162**

**Claims priority, application Japan, Mar. 20, 1973, 48-32894**

**Int. Cl.² H04B 3/14, 1/10**

**U.S. Cl. 325—42** **4 Claims**

1. In a self-adaptive equalizer for equalizing baseband signals derived from data signals of a multilevel data transmission system according to correlative encoding, including a transversal filter comprising, in turn, a delay line supplied with said baseband signals, a plurality of variable attenuators connected to the respective taps of said delay line, and an adder for summing up output signals of said variable attenuators to produce transversal filter output signals, wherein the improvement comprises, a first filter for removing said correlative encoding from said transversal filter output signals to produce first filter output signals of positive and negative signs, means responsive to said first filter output signals for producing binary signals representative of the signs of said first filter output signals, a second filter for encoding said binary signals in accordance with said correlative encoding to produce second filter output signals, means for producing difference signals representative of the differences between said transversal fitler output signals and the second filter output signals, and means for adjusting said variable attenuators in compliance with the respective products of each of said difference signals



and baseband signals derived from those taps of said delay line to which the relevant variable attenuators are connected.

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## 3,921,073
## ARRANGEMENT FOR CARRIER RECOVERY IN CARRIER FREQUENCY VIDEO AND DATA TRANSMISSION SYSTEMS

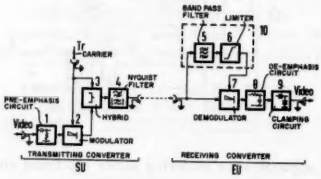
**Guenther Pexa, Munich, Germany, assignor to Siemens Aktiengesellschaft, Berlin & Munich, Germany**

**Filed Apr. 23, 1973, Ser. No. 353,907**

**Claims priority, application Germany, May 4, 1972, 2221892**

**Int. Cl.² H04B 13/00**

**U.S. Cl. 325—50** **5 Claims**



1. An arrangement for carrier recovery in carrier frequency video and data vestigal side band transmission systems in which over modulation may occur at the transmitting end, comprising: transmitting and receiving converters, said transmitting converter including a source of carrier, a modulator connected to said source, a hybrid connected to said source and to the output of said modulator for providing a carrier and a modulated carrier, a Nyquist filter connected to said hybrid to provide a vestigal side band with a carrier for transmission, and a pre-emphasis circuit having an information signal input, said preemphasis circuit connected to the input of said modulator for attenuating low frequency signals to provide a level of modulation of less than 100% for frequencies in a frequency region in the vicinity of the carrier, said receiving converter including a demodulator having an input for receiving transmitted signals from said transmitting converter, a device having an input connected to the input of said demodulator for receiving signals transmitted from said transmitting converter to recover the carrier and an output connected to said demodulator to feed the recovered carrier thereto, said device including a bandpass filter connected to the input of said demodulator and a limiter connected to said bandpass filter and having an output connected to said demodulator, and a de-emphasis circuit connected to the output of said demodulator.

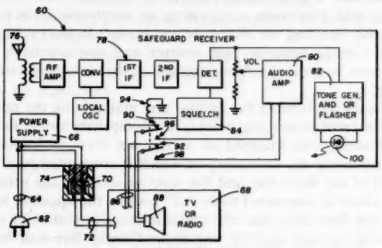
## 3,921,074
## SAFEGUARD SENTRY

**William C. Baird, 107 W. River St., Meridian, Tex. 76665**

**Continuation-in-part of Ser. No. 17,418, March 9, 1970. This application July 13, 1973, Ser. No. 379,171**

**Int. Cl.² H04B** *7/08*

**U.S. Cl. 325—303** **5 Claims**




1. Safeguard sentry circuitry which is continually energized to receive transmitted emergency information, comprising:

a tunable receiving set having a speaker connected thereto for producing an audible output, said tunable receiving set being tunable to any desired carrier frequency within its tuning range for providing ordinary programming audio output at said speaker;

an emergency signal receiver means independent of said tunable receiving set and being pretuned to a single predetermined emergency carrier frequency, said emergency signal receiver having radio-frequency and audio-frequency stages entirely distinct from those of said tunable receiving set for converting a received modulated emergency transmission at said predetermined carrier frequency into a corresponding audio-frequency output; and means for coupling said speaker of said tunable receiving set to the output of said emergency signal receiver means, said coupling means being operative to couple said speaker to the output of said emergency signal receiver means during the reception of any such audio frequency output irrespective of the frequency of the modulation of such emergency transmission signal and the corresponding frequency of such audio output of said emergency signal receiver.

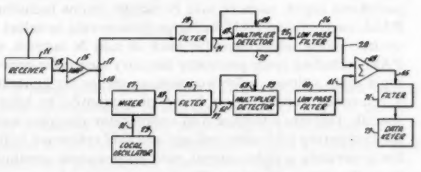
## 3,921,075
## RADIO TELETYPE DETECTOR CIRCUIT

**Robert B. Denny, Poway, Calif., assignor to Adar, Inc., Santa Ana, Calif.**

**Continuation of Ser. No. 327,782, Jan. 29, 1973, abandoned. This application June 24, 1974, Ser. No. 481,978The portion of the term of this patent subsequent to Dec. 31, 1991, has been disclaimed.**

**Int. Cl.² H04L** *27/14*

**U.S. Cl. 325—320** **1 Claim**




1. A circuit for detecting the differential amplitude of a pair of frequency tones in a frequency-shift-keying receiver, comprising:

a pair of filter circuits, each filter circuit responsive to a different one of said frequency tones, each of said pair of filter circuits including a filtering element of identical construction, one of said pair of filter circuits additionally comprising:

means for heterodyning one of said pair of frequency tones to provide a heterodyned signal to the filtering element in said one of said pair of filter circuits.

a pair of squaring and detecting circuits, each connected to the output of a different one of said filter circuits for squaring and detecting the presence of one of said frequency tones, said squaring and detecting circuits increasing the sensitivity of said differential amplitude detecting circuit to minor differences in amplitude of said pair of frequency tones, each of said squaring and detecting circuits comprising:

a multiplier having two inputs, each of said inputs being coupled to the same output signal from its respective filter circuit; and

a subtracting circuit responsive to the relative amplitude of the outputs of said pair of squaring and detecting circuits to produce a signal the polarity of which is determined by which of said pair of frequency tones has the higher amplitude.

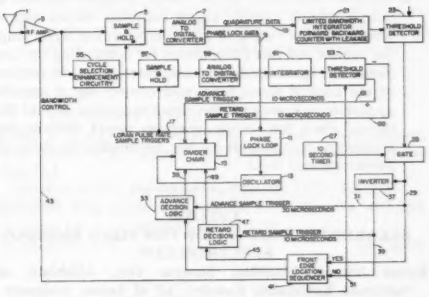
## 3,921,076
## METHOD OF AND APPARATUS FOR LOCATING PREDETERMINED PORTIONS OF A RADIO-FREQUENCY PULSE, PARTICULARLY ADAPTED FOR LEADING EDGE LOCATION OF LORAN AND SIMILAR NAVIGATIONAL PULSES

**John M. Currie, Westford, Mass., assignor to International Navigation Corporation, Bedford, Mass.**

**Filed Mar. 8, 1973, Ser. No. 339,182**

**Int. Cl.² H04L** *7/00*

**U.S. Cl. 325—321** **25 Claims**




1. A method of locating a predetermined cycle in a transmitted pulse envelope, that comprises, monitoring such pulse envelope transmissions; searching for signal information during such monitoring and, upon locating the same, sampling the signal information backwardly in predetermined successive time intervals relatively wide compared with the cycle period until no signal information is detected; sampling forwardly in different narrower predetermined successive time intervals until signal information is detected; and continuing the forward sampling to the said predetermined cycle.

## 3,921,077
## NOISE REDUCTION APPARATUS

**Kouzi Suzuki, Gumma, Japan, assignor to Sanyo Electric Company, Ltd., Osaka and Tokyo Sanyo Electric Co., Ltd., Bumma, both of, Japan**

**Filed June 6, 1974, Ser. No. 477,035**

**Claims priority, application Japan, June 6, 1973, 48-64401**

**Int. Cl.² H04B** *1/10*

**U.S. Cl. 325—477** **3 Claims**

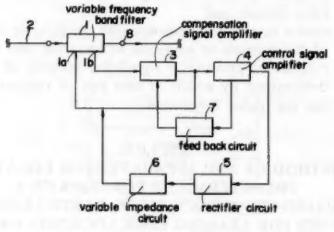
1. A high frequency noise reduction apparatus comprising:

a. a variable frequency band pass filter means having a variable frequency characteristic, for receiving a program source

signal and high frequency noise and for attenuating the high frequency noise when the program source signal does not contain a high frequency component or when the amplitude of the program source signal is below a predetermined level, the frequency characteristic of said filter means varying in response to a compensation signal applied thereto;

b. compensation signal amplifier means, having its input coupled to said filter means for receiving the program source signal from said filter means and for deriving a compensation signal therefrom, the output of said compensation signal amplifier means being coupled to said filter means for applying the compensation signal thereto;

c. control signal amplifier means, having its input coupled




to the output of said compensation signal amplifier means, for generating a control signal when said program source signal includes a high frequency component or has an amplitude below the predetermined level;

d. variable impedance circuit means, coupled between the output of said control signal amplifier means and the junction of the output of said compensation signal amplifier means and said filter means for controlling the compensation signal applied to said filter means in response to the control signal from said control signal amplifier such that no compensation signal is applied to said filter means when the source program signal contains high frequency components or has an amplitude above the predetermined level.

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## 3,921,078
## BREAKDOWN PROTECTION FOR FIELD EMISSION ELECTRON GUN

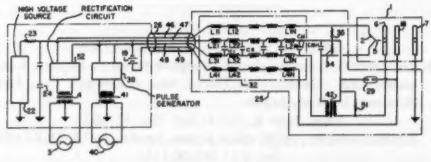
**Ryuzo Aihara, Machida; Susumu Ota, Akishima, and Nobuyuki Kobayashi, Kodaira, all of Japan, assignors to Nihon Denshi Kabushiki Kaisha, Tokyo, Japan**

**Continuation-in-part of Ser. No. 245,232, April 18, 1972, Pat. No. 3,810,025. This application Oct. 26, 1973, Ser. No. 409,918**

**Claims priority, application Japan, Apr. 20, 1971, 46-30876; May 11, 1971, 46-31405; Sept. 7, 1971, 46-69070The portion of the term of this patent subsequent to May 7, 1991, has been disclaimed.**

**Int. Cl.[2] H02H** *7/09*; **H01J** *37/24, 37/285*

**U.S. Cl. 328—10** **1 Claim**




1. A field emission type electron gun device comprising:

i. an emitter for emitting an electron beam,

ii. an anode for accelerating the electron beam,

iii. a high voltage source for supplying negative high potential to said emitter in order to accelerate said electron beam,

iv. an electrode located between said emitter and said anode,

v. a voltage source for generating a potential difference between said electrode and said emitter in order to generate a strong electric field in the vicinity of said emitter tip, and

vi. a protection means for preventing the generation of an unusually high potential difference between said emitter and said electrode, comprising an electronic switch for rapidly shorting the electrode and emitter in the event that the voltage between said emitter and said electrode increases beyond the firing voltage of the switching circuit, and

vii. means for heating the emitter and maintaining the potential thereof comprising a delay line comprising two coils and a reactive coil wrapped on a common core, an insulating transformer the secondary of which is connected to a first coil of the delay line and the reactive coil and the primary of which is connected to an A.C. source, the opposite leads to said first delay line coil and said reactive coil being connected to said emitter, the second delay line coil being connected at one end to said high voltage source (iii) and at the other end through balancing resistors to each side of said emitter and through said protection circuit to said electrode (iv).

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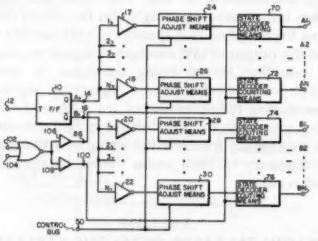
## 3,921,079
## MULTI-PHASE CLOCK DISTRIBUTION SYSTEM

**Samuel T. Heffner, Villa Park, and Ronald F. Kowalik, Lombard, both of Ill., assignors to GTE Automatic Electric Laboratories Incorporated, Northlake, Ill.**

**Filed May 13, 1974, Ser. No. 469,150**

**Int. Cl.[2] H03K** *1/12, 3/04*

**U.S. Cl. 328—62** **11 Claims**




1. A multi-phase clock distribution circuit driven by a signal frequency source for generating N outputs, where N is an integer greater than one, each of said N outputs producing a pulse in a pulse train where each pulse in the pulse train is related to any other pulse by a multiple period of the source signal frequency, said clock distribution circuit comprising:

phase shift adjust circuitry means (PAM) driven by said signal frequency for selectively delaying an edge of said signal waveform input, each of said N output chains including a PAM, each of said PAM being programmable to select the desired phase adjustment for each of said N outputs, said PAM including ramp generator circuitry means for generating a ramp voltage, reference voltage means for generating a reference voltage upon being programmed to select a specific reference voltage and comparator circuitry means for comparing said ramp voltage and said reference voltage for generating a pulse output, said pulse output continuing from the time said ramp voltage equals said reference voltage until the next successive edge of said signal frequency source occurs, and

state decoder counting circuitry means (SDCM) driven by said PAM for generating an output, each of said PAM driving one of said SDCM, each SDCM having an output that is phase related to said other SDCM outputs by a multi-

ple of the period of said source signal frequency and said selected delay in said PAM, each SDCM output reproducing the phase delay selected in said PAM driving said SDCM.

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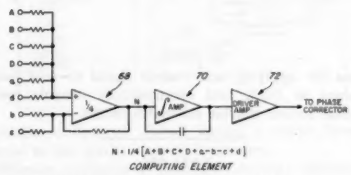
## 3,921,080
## ANALOG DATA PROCESSOR

**John W. Hardy, Lexington, Mass., assignor to Itek Corporation, Lexington, Mass.**

**Filed Jan. 3, 1974, Ser. No. 430,455**
**Int. Cl. H03d** *13/00*
**U.S. Cl. 328—133** **3 Claims**




**1.** A circuit for determining in real time the phase value N of a particular point, in an array of points, relative to a given reference point in the array, said particular point being surrounded by four adjacent points having phase values designated as A, B, C and D relative to said given reference point, and said four adjacent points having phase shifts relative to said particular point designated as *a*, *b*, *c* and *d*, and including means for measuring the relative phase values A, B, C and D of said four adjacent points and for producing electrical signals representative of A, B, C and D, and means for measuring the relative phase shifts *a*, *b*, *c* and *d* of said four adjacent points and for producing electrical signals representative of *a*, *b*, *c* and *d* and including analog means for combining said signals representative of A, B, C, D, *a*, *b*, *c*, and *d* according to the following formula $N = \frac{1}{4}(A + B + C + D + a - b - c + d)$ to achieve an analog signal representative of the relative phase value N of said particular point.

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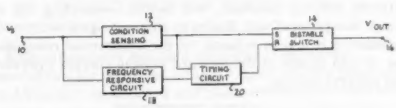
## 3,921,081
## PULSE GENERATOR FOR PRODUCING PULSES OF DEFINABLE WIDTH

**Lawrence Jubin Lane, Stuarts Draft, Va., assignor to General Electric Company, Salem, Va.**

**Filed Oct. 30, 1974, Ser. No. 519,261**
**Int. Cl.² H03K** *1/18*
**U.S. Cl. 328—140** **7 Claims**




**1.** A pulse generating circuit providing pulses each having a width corresponding to a prescribed percentage of the period of a variable frequency source signal comprising:

a. means to provide a pulse initiation signal in response to a prescribed condition of said source signal;

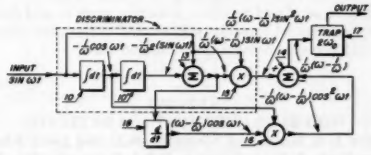
b. means to generate a pulse termination signal after a period of time from the occurrence of said initiation signal including means responsive to the frequency of said source signal to determine said period of time; and

c. means responsive to said initiation signal and said termination signal to provide an output pulse having a duration corresponding to said time period.

## 3,921,082
## WIDEBAND COHERENT FM DETECTOR

**Edward J. A. Kratt, 3rd, Montville, N.J., and Jacob Klapper, New York, N.Y., assignors to R F L Industries, Inc., Boonton, N.J.**

**Division of Ser. No. 332,600, Feb. 15, 1973, Pat. No. 3,854,099. This application July 31, 1974, Ser. No. 493,259**
**Int. Cl.² H03D** *3/06*
**U.S. Cl. 329—110** **7 Claims**




**1.** Apparatus for demodulating a frequency modulated carrier wave, which apparatus comprises,

a. a first network comprising a first integrator receiving said wave and producing a first output and a second integrator receiving said first output and producing a second output, said second output and the input to said first integrator being of substantially opposite polarity and having amplitudes which cross at a predetermined frequency,

b. circuit elements applying the said second output and the input to the said first integrator to a first summer producing substantially a zero output at the said predetermined frequency,

c. a first coherent amplitude detector having two inputs, and

d. circuit elements applying the output of said summer to one input of said detector, the other input to said detector being derived from the input to said first integrator, the output of said detector being the demodulated wave.

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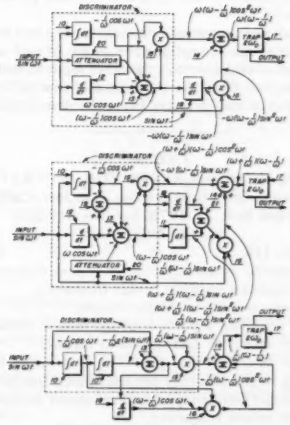
## 3,921,083
## WIDEBAND COHERENT FM DETECTOR

**Edward J. A. Kratt, 3rd, Montville, N.J., and Jacob Klapper, New York, N.Y., assignors to R F L Industries, Inc., Boonton, N.J.**

**Division of Ser. No. 332,600, Feb. 15, 1973, Pat. No. 3,854,099. This application July 31, 1974, Ser. No. 493,260**
**Int. Cl.² H03D** *3/06*
**U.S. Cl. 329—110** **14 Claims**




**1.** Apparatus for demodulating a frequency modulated carrier wave, which apparatus comprises,

a. a first network comprising a first integrator receiving said wave and producing a first output and a first differentiator receiving said wave and producing a second output, the two outputs being of substantially opposite polarity and having different amplitude vs frequency responses which cross at a predetermined frequency,
b. circuit elements applying the said two outputs to a first summer producing substantially a zero output at said predetermined frequency,
c. a first coherent amplitude detector having two inputs, and
d. circuit elements applying the output of said summer to one input of said detector, the other input to said detector being derived from the said second output, the output of said detector being a demodulated wave.

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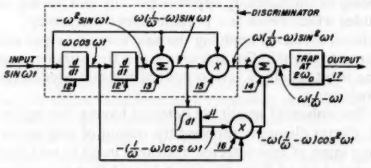
**3,921,084**

## WIDEBAND COHERENT F M DETECTOR

**Edward J. A. Kratt, 3rd, Montville, N.J., and Jacob Klapper, New York, N.Y., assignors to R F L Industries, Inc., Boonton, N.J.**

**Division of Ser. No. 332,600, Feb. 15, 1973, Pat. No. 3,854,099. This application July 31, 1974, Ser. No. 493,338**
**Int. Cl.² H03D** *3/06*
**U.S. Cl. 329—110** **7 Claims**




1. Apparatus for demodulating a frequency modulated carrier wave, which apparatus comprises,
a. a first network comprising a first differentiator receiving the said wave and producing a first output and a second differentiator receiving the first output and producing a second output, said second output and the input to said first differentiator being of substantially opposite polarity and having amplitudes which cross at a predetermined frequency,
b. circuit elements applying the said second output and the input to said first differentiator to a first summer producing substantially a zero output at the said predetermined frequency,
c. a first coherent amplitude detector having two inputs, and
d. circuit elements applying the output of said summer to one input of said detector, the other input to said detector being derived from the input to said first differentiator, the output of said detector being the demodulated wave.

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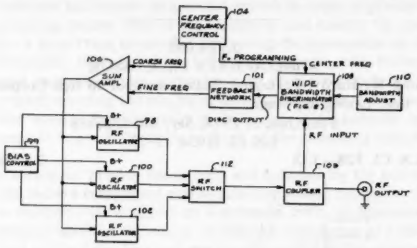
**3,921,085**

## FREQUENCY DISCRIMINATOR APPARATUS

**William J. Keane, 3599 Ensalmo Ave., San Jose, Calif. 95118**

**Filed Nov. 23, 1973, Ser. No. 418,232**
**Int. Cl.² H03D** *3/00*
**U.S. Cl. 329—116** **26 Claims**

1. An automatic frequency control system comprising
resonator means a variable center frequency,
electronically tunable oscillator means,
means for coupling a portion of the power output of said oscillator means to said resonator means,
means for electroncially providing a relative frequency sweeping over a common predetermined frequency range of the center frequency of said resonator means and said oscillator means frequency,
detector means receiving an output from said resonator means,
means for comparing the phase of said sweeping means to the output of said detector means to provide an output signal, and




means for applying said output signal to said oscillator means to track said electronically tunable oscillator means to said tunable resonator means.

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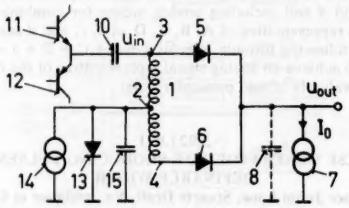
**3,921,086**

## DEMODULATOR CIRCUIT FOR AMPLITUDE-MODULATED SIGNALS INCLUDING DIODES WITH LIKE POLES INTERCONNECTED AND A CURRENT SOURCE BIASING THE DIODES IN THEIR FORWARD CONDUCTING DIRECTION

**Alois Marek, Nussbaumen, Switzerland, assignor to BBC Brown Boveri & Company Limited, Baden, Switzerland**

**Filed Dec. 18, 1973, Ser. No. 425,840**
**Claims priority, application Switzerland, Dec. 21, 1972, 18589/72**
**Int. Cl.² H03D** *1/10*
**U.S. Cl. 329—204** **11 Claims**




1. A demodulation circuit for amplitude-modulated electrical signals which includes at least two diodes having a pair of like poles thereof interconnected with each other, a current source connected to said diodes for biasing said diodes in their forward conducting direction such that the sum of the diode currents remains constant, and means connecting the other pair of like poles of said diodes to an input signal source whose impedance is low in relation to the differential resistance of one of said diodes at the forward biasing current provided by said current source.

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**3,921,087**

## ELECTROSTATIC FIELD MODULATOR HAVING A TUNING FORK

**Robert E. Vosteen, 315 W. Center St., Medina, N.Y. 14103**

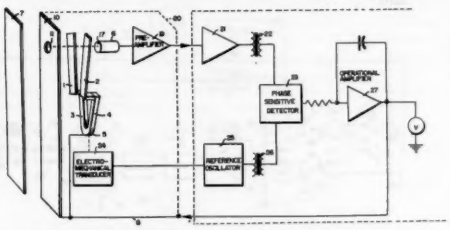
**Continuation of Ser. No. 767,147, Oct. 14, 1969, abandoned. This application May 12, 1971, Ser. No. 142,801**
**Int. Cl.² G01R** *19/00*
**U.S. Cl. 330—2** **21 Claims**

1. An electrostatic measuring apparatus to measure unknowns such as the electrostatic potential of a surface in non-contacting manner or an electrostatic field with a capacitive detector having a sensitive electrode positionable in electrostatic coupling relationship with the surface or in the elec-

trostatic field to produce a detector signal representative of the magnitude and polarity of the unknown being measured comprising:

a tuning fork with first and second tines mounted to respective ends thereof, operatively postioned to be able to vary the coupling relationship,

drive means to vibrate the tuning fork at a predetermined frequency to vary the coupling relationship and produce



modulated detector signals having a carrier frequency equal to the predetermined frequency,

a reference oscillator to produce reference signals at the predetermined frequency,

a detector connected to receive the reference signals and modulated detector signals at a fixed phase relationship to demodulate the latter and produce an output signal indicative of the magnitude and polarity of the unknown being measured.

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**3,921,088**

**DIRECT-CURRENT ISOLATION AMPLIFIER**

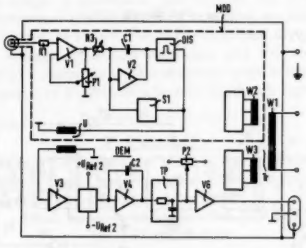
**Peter Feucht, Berlin, Germany, assignor to Siemens Aktiengesellschaft, Munich, Germany**

**Filed Dec. 10, 1973, Ser. No. 423,118**

**Claims priority, application Germany, Dec. 11, 1972, 2260440**

**Int. Cl.² H03F** *3/38*

**U.S. Cl. 330—10** **7 Claims**



1. A direct-current isolation amplifier comprising:

a modulator for receiving an input signal and for generating a frequency-modulated and pulse width modulated alternating voltage pulse signal, the pulses of which have a constant width and are generated at a frequency which is proportional to the magnitude of said input signal to said modulator;

transmission means coupled to said modulator for transmitting said pulse signal; and,

a demodulator coupled to said transmission means for demodulating said pulse signal as a frequency-modulated signal when said pulses of said pulse signal are not transmitted by said transmission means to said demodulator with said constant width, and for demodulating said pulse signal as a pulse-width modulated signal when said pulses are transmitted by said transmission means to said demodulator accurately with said constant width.

**3,921,089**

**TRANSISTOR AMPLIFIER**

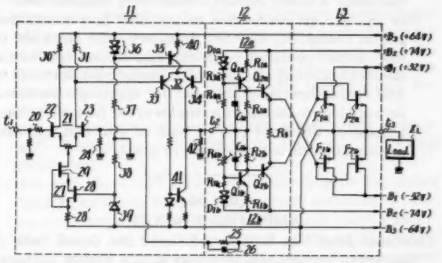
**Katsuaki Tsurushima, Kawasaki, Japan, assignor to Sony Corporation, Tokyo, Japan**

**Filed Sept. 24, 1974, Ser. No. 508,836**

**Claims priority, application Japan, Sept. 28, 1973, 48-109120**

**Int. Cl.² H03F** *3/16*

**U.S. Cl. 330—13** **20 Claims**



1. A transistor amplifier comprising: voltage supply means for supplying an operating voltage susceptible to voltage fluctuations: at least a first triode characteristic field effect transistor having gate, source and drain electrodes; means for applying said operating voltage across said drain and source electrodes through a load; input circuit means for applying an input signal to be amplified to said gate electrode of the triode characteristic field effect transistor; and biasing circuit means for applying a gate bias voltage to said gate electrode and including compensating means connected between said voltage supply means and said gate electrode for varying said gate bias voltage in response to voltage fluctuations in said operating voltage so as to stabilize the biasing DC drain current of said triode characteristic field effect transistor in spite of said voltage fluctuations in the operating voltage therefor.

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**3,921,090**

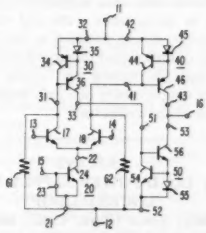
**OPERATIONAL TRANSCONDUCTANCE AMPLIFIER**

**Carl Franklin Wheatley, Jr., Somerset, and Harold Allen Wittlinger, Pennington, both of N.J., assignors to RCA Corporation, New York, N.Y.**

**Filed Nov. 14, 1974, Ser. No. 523,759**

**Int. Cl.² H03F** *3/45*

**U.S. Cl. 330—30 D** **8 Claims**



1. In combination:

a supply of first and second operating potentials;

an input amplifier having an input circuit for application of input signal and having a balanced output circuit for supplying first and second currents which vary in push-pull relationship to each other responsive to said input signal;

first and second transistors having emitter electrodes connected to said first operating potential, having their re-

spective base electrodes connected to the balanced output circuit of said input amplifier to conduct respectively said first current and said second current, and having collector electrodes;

a current mirror amplifier having an input terminal to which said first transistor collector electrode is direct current conductively coupled, having a common terminal connected to said second operating potential, and having an output terminal to which said second transistor collector electrode is direct current conductively coupled; and

first and second conductive means, said first conductive means connecting said first transistor base electrode to said second operating potential, said second conductive means connecting said second transistor base electrode to said second operating potential, for applying a sustained forward bias to the base electrodes of the first and second transistors whenever one or both of said first and said second currents is zero-valued or nearly so.

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## 3,921,091
## AMPLIFIER CIRCUIT

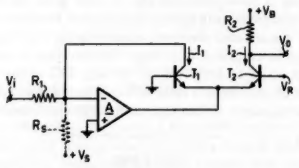
**Theodorus Jozef Van Kessel, and Gerrit Jan Scholl, both of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.**

**Continuation of Ser. No. 392,793, Aug. 29, 1973, abandoned, which is a continuation of Ser. No. 251,008, May 8, 1972, abandoned. This application Jan. 16, 1975, Ser. No. 541,445**

**Claims priority, application Netherlands, May 14, 1971, 7106620**

**Int. Cl.² H03F** *3/68*

**U.S. Cl. 330—30 D** **11 Claims**




1. A circuit comprising an amplifier having an at least a first input means for receiving an input signal to be amplified, and a voltage source output means having a low output impedance; first and second transistors each having emitter electrodes coupled to said output means, base electrodes adapted to receive a differential control signal, whereby a division of the output current from said amplifier is effective between said transistors in accordance with said control signal, and collector electrodes; means coupled to said second transistor for providing an output signal in accordance with the current therethrough; and alternating and direct current negative feedback means coupled between one amplifier input means and said first transistor collector.

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## 3,921,092
## RESONANT LOAD POWER SUPPLY WITH PHASE LOCKED LOOP

**Douglas S. Schatz, Santa Clara, Calif., assignor to Applied Materials, Inc., Santa Clara, Calif.**

**Filed May 22, 1974, Ser. No. 472,191**

**Int. Cl.² H03B** *3/04*; **H05B** *5/06*

**U.S. Cl. 331—1 R** **7 Claims**

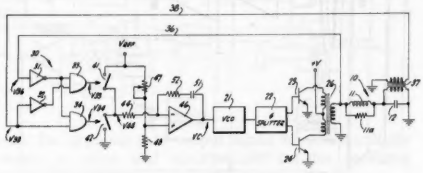
1. In a power supply for delivering power to a resonant load comprising a vapor source work coil for inducing a current in a material to be vaporized and a capacitive element connected electrically in series with the coil:

A. a voltage controlled oscillator for providing an output signal having a frequency determined by a control signal;

B. means responsive to the oscillator signal for delivering power to the load at the frequency of the oscillator signal;

C. a phase detector for monitoring the phases of the voltage delivered to the load and the voltage developed across the capacitive element and providing output signals corresponding to the relative phases of said voltages;

D. means responsive to the phase detector output signals for providing a signal having an average magnitude corresponding to the relative phases of the voltage delivered to the load and the voltage across the capacitive element; and



E. means for comparing the average magnitude of the last named signal with a reference signal having a level corresponding to a predetermined difference in the monitored phases and varying the voltage of the control signal applied to the oscillator in accordance with deviations of the average magnitude from the level of the reference signal to maintain the oscillator signal at a predetermined frequency.

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## 3,921,093
## ACOUSTIC WAVE OSCILLATOR

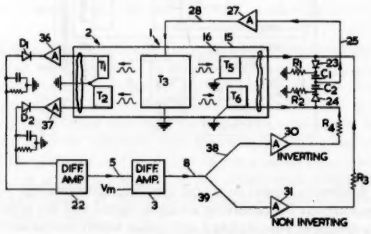
**Meirion Francis Lewis, Malvern, England, assignor to The Secretary of State for Defence in Her Britannic Majesty's Government of the United Kingdom of Great Britain and Northern Ireland, London, England**

**Filed Nov. 6, 1974, Ser. No. 521,400**

**Claims priority, application United Kingdom, Nov. 9, 1973, 52237/73**

**Int. Cl.² H03B** *3/04*

**U.S. Cl. 331—1 A** **8 Claims**

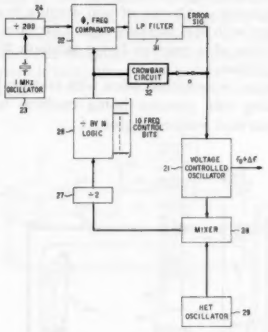



1. An acoustic wave device including an acoustic wave delay line providing a feedback loop to an amplifier to form an oscillator, and a discriminator for providing a control signal to apply to phase shift circuitry in the feedback loop for varying the frequency of the oscillator, the delay line comprising a substrate able to support acoustic waves along a flat surface thereof, input and output transducers for launching and receiving acoustic waves in the substrate, the discriminator comprising at least one transducer arranged on the substrate to receive acoustic waves from the input transducer and provide a control signal which is substantially linear with frequency near the oscillator centre frequency.

## 3,921,094
## PHASE-LOCKED FREQUENCY SYNTHESIZER WITH MEANS FOR RESTORING STABILITY

**Clifford Warren Schaible, Morristown, N.J., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.**

**Filed Oct. 7, 1974, Ser. No. 512,537**
**Int. Cl.² H03B** *3/04*
**U.S. Cl. 331—1 A** **5 Claims**

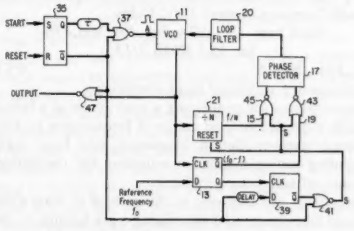



1. A frequency synthesizer of the type in which a voltage-controlled oscillator is disposed in a phase-locked loop including a phase and frequency comparator adapted to receive an external reference signal and a feedback signal to generate an error signal, means for applying the error signal to the control circuit of the voltage-controlled oscillator, means for deriving the feedback signal from the output signal generated by the voltage-controlled oscillator, and in which means are provided for altering the loop to facilitate frequency pull-in under some conditions of operation, characterized in that the deriving means includes frequency-count-down circuit means for deriving the feedback signal, said circuit means generating a substantially zero feedback signal when its frequency-response range is exceeded, and in that the loop altering means comprises semiconductive switching means for effectively disabling the loop between the output of the comparator and the voltage-controlled oscillator and for resetting the oscillator to a midpoint of its frequency range when the circuit means generates a substantially zero feedback signal.

## 3,921,095
## STARTABLE PHASE-LOCKED LOOP OSCILLATOR

**David Chau-Kwong Chu, Woodside, Calif., assignor to Hewlett-Packard Company, Palo Alto, Calif.**

**Filed Nov. 14, 1974, Ser. No. 523,631**
**Int. Cl.² H03B** *3/04*
**U.S. Cl. 331—1 A** **6 Claims**




1. A phase-locked oscillator comprising:

frequency generating means for producing an output signal of a frequency responsive to the level of an input signal;

scaling means for producing a divided signal output having a pulse spacing equal to the total spacing of N pulses of a signal appearing at the input of the scaling means, where N is a predetermined integer;

mixing means responsive to the output signal of the frequency generating means and to a reference frequency for producing a beat signal output;

phase comparison means for comparing the phases of the divided signal output from the scaling means and the beat signal output from the mixing means and generating an error signal indicative of a phase difference therebetween, said error signal supplying the input signal to the frequency generating means to thereby vary the frequency of the output signal from the frequency generating means to lock this frequency in a fixed relation with the reference frequency;

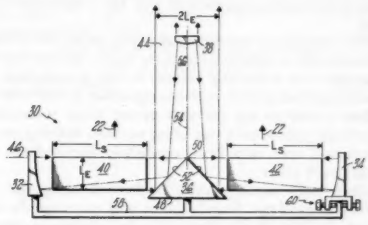
restart means for generating a restart signal which momentarily shuts down and restarts the frequency generating means; and

inhibit and phase shift means for responding to the restart signal by inhibiting the phase comparison means from causing perturbations in the input signal to the frequency generating means and altering the phase of the scaling means output to match a change in phase if any of the beat signal arising from the restart of the frequency generating means, and for reactivating the phase comparison means upon the occurrence of a predetermined phase in the beat signal output.

## 3,921,096
## UNSTABLE SPLIT MODE LASER RESONATOR

**Peter P. Chenausky; Anthony J. DeMaria, both of West Hartford; David W. Fradin, Manchester, and Robert J. Freiberg, South Windsor, all of Conn., assignors to United Technologies Corporation, Hartford, Conn.**

**Filed Dec. 16, 1974, Ser. No. 533,376**
**Int. Cl.² H01B** *3/081*
**U.S. Cl. 331—94.5 C** **6 Claims**




1. In an unstable resonator configuration having an axis of optical symmetry which passes through an interlocked resonant mode region and including a plurality of gain regions symmetrically disposed about the axis of symmetry, the combination comprising:

an output coupling mirror having a curved reflective surface and positioned symmetrically about the axis of optical symmetry;

a first gain medium region having a first longitudinal axis nonparallel to the axis of optical symmetry;

a first end mirror including a first reflective surface having a center of curvature along a first axis which intersects, and at the point of intersection is perpendicular to, the first reflective surface, the first end mirror being positioned at one end of the first gain medium and being intersected by the first axis;

a second gain medium having a second longitudinal axis nonparallel to the axis of optical symmetry;

a second end mirror including a second reflective surface having a center of curvature along a second axis which intersects, and at the point of intersection is perpendicu-

lar to, the second reflective surface, the second end mirror being positioned at one end of the second gain medium and being intersected by the second axis; and

a center mirror having a first and a second flat reflective surface which intersect to form a line of intersection and are symmetrically disposed about the axis of optical symmetry and oriented to allow the first end mirror and the coupling mirror to form a first resonant cavity which includes the first gain region and the second end mirror and the coupling mirror to form a second resonant cavity which include the second gain region wherein the first and second resonant cavities include the interlocked resonant mode region.

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**3,921,097**

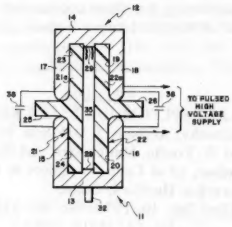
**CROSSED-FIELD EXCITATION, PULSED GAS LASER**

**Robert F. Caristi; Donald A. Leonard, both of Stoneham, and Irving Itzkan, Boston, all of Mass., assignors to Avco Everett Research Laboratory, Inc., Everett, Mass.**

**Filed May 30, 1974, Ser. No. 474,780**

**Int. Cl.[2] H01S** *3/03, 3/097*

**U.S. Cl. 331—94.5 G** **7 Claims**




**1.** In a laser device for producing pulses of laser radiant energy and having a longitudinal axis, the combination comprising:

a. first and second oppositely disposed generally U-shaped electrically conductive electrode means spaced one from another and extending parallel to said longitudinal axis, said electrode means each having a base portion intermediate a pair of leg portions having inner surfaces, the extreme ends of each pair of leg portions defining an open end, said open ends being oppositely disposed and adjacent each other;

b. electrically nonconductive means insulating said electrode means one from another and covering the inner surfaces of the leg portions of each electrode means to at least in part with said base portions define an elongated duct;

c. means closing the ends of said duct to define an enclosed region for receiving a lasable gaseous medium; and

d. circuit means coupled to said electrode means for providing pulsed electric discharges through said lasable gaseous medium in said cavity to produce lasing action therein, said discharges being provided substantially uniformly along substantially the length of and across said cavity normal to said longitudinal axis.

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**3,921,098**

**PRESSURIZED LASER HOUSING**

**Ethan D. Hoag, Boston, Mass., assignor to Avco Everett Research Laboratory, Inc., Everett, Mass.**

**Continuation-in-part of Ser. No. 339,514, March 9, 1973, abandoned. This application Sept. 27, 1974, Ser. No. 510,120**

**Int. Cl.[2] H01S** *3/22*

**U.S. Cl. 331—94.5 G** **7 Claims**

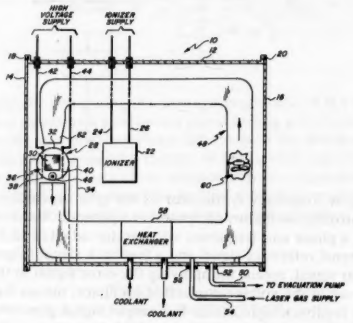
**1.** In a flowing gas laser system, the combination comprising:

an outer pressurized box-like housing capable of sealably withstanding heavy pressure differentials between the interior of said housing and the external atmosphere;

first means defining a working region disposed within said housing, said first means including further means for permitting gaseous lasing medium disposed in said working region to leave same and enter that portion of the interior of said housing exterior of said ducting and working region;

closed cycle lightweight ducting mounted within said pressurized housing, each end of said ducting being in communication with said working region for directing a high velocity flow of a gaseous lasing medium through said working region;

ionizing means in communication with said working region for ionizing said gaseous lasing medium substantially throughout said working region;




electrode means disposed within said working region for impressing a voltage across said ionized gaseous lasing medium in said working region thereby exciting said gaseous lasing medium and creating a population inversion;

means carried by said housing for removing from said housing gaseous lasing medium exterior of said closed cycle ducting; and

blower means mounted in said ducting for imparting movement to the lasing medium disposed in said ducting, the lasing medium filling said housing and ducting, the lasing medium in the working region during operation being at a slightly different pressure due to its velocity than the pressure of said lasing medium in said housing exterior of said ducting and working region.

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**3,921,099**

**FREQUENCY STABILIZED LASER**

**Richard L. Abrams, Pacific Palisades, and Thomas A. Nussmeier, Thousand Oaks, both of Calif., assignors to Hughes Aircraft Company, Culver City, Calif.**

**Filed Sept. 16, 1974, Ser. No. 506,476**

**Int. Cl.[2] H01S** *3/13*

**U.S. Cl. 331—94.5 S** **6 Claims**

**1.** A frequency stabilized laser comprising:

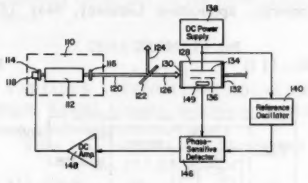
a laser oscillator for generating a laser beam at a frequency within a predetermined range of frequencies including a desired laser oscillation frequency, said laser oscillator including tuning means for adjusting the oscillation frequency of said laser oscillator;

a Stark-effect cell disposed in the path of at least a portion of said laser beam and containing a gas having an absorption resonance in the vicinity of said desired laser oscillation frequency;

means for applying a dc signal to said Stark-effect cell to adjust the center frequency of said absorption resonance

to a value equal to said desired laser oscillation frequency;

means for applying an alternating reference signal to said Stark-effect cell to vary the center frequency of said absorption resonance about said desired laser oscillation frequency at the frequency of said reference signal and thereby amplitude modulate the laser beam traversing said Stark-effect cell such that the amplitude of the fundamental modulation component is indicative of the magnitude of the frequency difference between the instantaneous oscillation frequency of said laser oscillator and the average center frequency of said absorption resonance, and the phase of said fundamental modulation component is indicative of the polarity of said frequency difference;




means including microphone means disposed in said Stark-effect cell for sensing pressure changes in said gas resulting from changes in the amount of laser energy absorbed by said gas for producing an electrical signal corresponding to the amplitude modulation on said laser beam traversing said Stark-effect cell;

means for producing from said reference signal and said electrical signal an error signal indicative of the magnitude and polarity of said frequency difference; and

means for feeding said error signal back to said tuning means to control the oscillation frequency of said laser oscillator in accordance with said error signal to stabilize said generated laser beam at said desired laser oscillation frequency.

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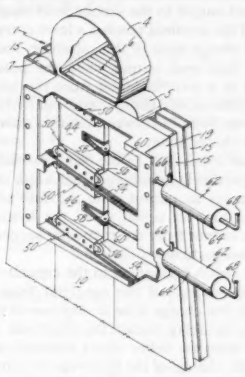
**3,921,100**

## GAS DYNAMIC LASER HAVING SHUTTER DOORS

**John B. Olinger, Jr., Lake Park, and Roger L. Wahl, Tequesta, both of Fla., assignors to United Technologies Corporation, Hartford, Conn.**

**Filed Sept. 23, 1974, Ser. No. 508,791**
**Int. Cl.[2] H01S** *3/02, 3/08, 3/22*
**U.S. Cl. 331—94.5 D** **1 Claim**

1. In a gas dynamic laser the combination comprising: means for providing a lasing gas, a housing forming a lasing cavity, a nozzle array for introducing a gas containing constituents necessary to obtain a lasing action into said lasing cavity, diffuser means for directing gas flow from said cavity, said housing around said lasing cavity having a first opening on one side thereof and a second opening on the other side, a first box means located on the exterior of said housing around said first opening, a second box means located on the exterior of said housing around said second opening, a mirror positioned in each box means in alignment with said two openings, a third opening located in said housing downstream of said other openings, said third opening being positioned to receive an output beam from said mirror in said second box means, said third opening also being connected to said first box means, a fourth opening in said first box means aligned with said third opening to permit the output beam to pass to the exterior of the first box means, an aerodynamic window connected to said fourth opening, a shutter door being located in said first and second box means adjacent each of said openings to reduce the volume necessary to be evacuated by the diffuser means during the start of flow through the diffuser means and to control the opening and closing of said openings to start and stop the lasing action, one shutter door in said first box means being located between the mirror and first opening, one shutter door being located in said first box means between said third opening and aerodynamic window, one shutter door in said second box means being located between the mirror and second opening, means for sliding each door at an angle to the



plane of the opening in said housing so that a shutter door is rapidly moved to and from its closed position, means for actuating said shutter doors to move them between an open and closed position, means for reducing the pressure in both the first and second box means when the doors are closed to balance the pressure on both sides of the doors in preparation for starting the lasing action.

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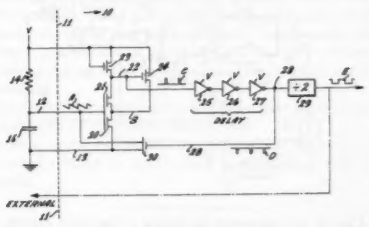
**3,921,101**

## MOSFET CLOCK

**Michael R. McCoy, San Jose, and Terry R. Walther, Sunnyvale, both of Calif., assignors to Electronic Arrays, Inc., Mountain View, Calif.**

**Filed Oct. 5, 1973, Ser. No. 403,982**
**Int. Cl.[2] H03K** *3/353*
**U.S. Cl. 331—108 D** **13 Claims**




1. An oscillator circuit for cooperation with and use in integrated circuit chips of the MOSFET variety, comprising: an RC circuit connected between an operating voltage and ground and having a terminal, the RC circuit composed of discrete circuit elements which include at least one capacitor and at least one resistor connected thereto, the potential of said terminal representing the charge state of the capacitor, the potential of said terminal changing gradually from a first charge state of the capacitor towards a second charge state thereof through current flow through the resistor;

a hysteresis circuit in the chip having an input terminal connected through an interface connector to the terminal of said RC circuit and having an internal output terminal, said circuit being constructed from MOSFET elements and being connected to operating potential and ground

potential as applied to the chip to have in each instant a first or a second switching state in which respectively first and second level outputs are effective at the internal output terminal, one of the first and second level outputs having value close to ground potential, the other one of the first and second level outputs being different from ground, the hysteresis circuit provided for switching from the first level output to the second level output when the potential of the terminal reaches a level corresponding to the second charge state of the capacitor, and for returning to the first level output when the potential at the terminal is at a level different from the level as corresponding to the second charge state, but corresponding to a third charge state in between the first charge state and the second charge state;

a delay circuit connected to the output of said hysteresis circuit to provide a switching signal when the hysteresis circuit switches its output from the first to the second level and a turn-off signal when the hysteresis circuit switches its output from the particular second to the first level but at a particular delay; and

an electronic switch connected to the capacitor for rapidly changing the charge of the capacitor from the second towards the first charge state in response to the switching signal from the delay circuit, the electronic switch being turned off when the delay circuit transmits to the switch delayedly the change of the hysteresis circuit output from the second level to the first level, the delay being sufficient so that the electronic switch is not turned off until the capacitor has reached the first charge state.

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## 3,921,102
## CIRCUIT ARRANGEMENT INCLUDING A GYRATOR RESONANT CIRCUIT

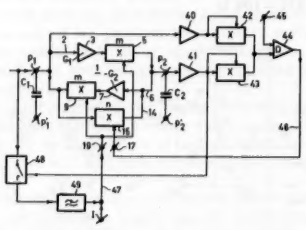
**Johannes Otto Voorman; Nicolaas Van Hurck, and Arnoldus Biesheuvel, all of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.**

**Filed July 17, 1974, Ser. No. 489,370**

**Claims priority, application Netherlands, July 23, 1973, 7310195**

**Int. Cl.[2] H03K** *7/02, 9/00;* **H03B** *5/00;* **H03H** *11/00*

**U.S. Cl. 332—9 R** **7 Claims**



1. Circuit arrangement including a resonant circuit in the form of a gyrator having a first port and a second port which each are terminated by a capacitor, the said gyrator comprising a first series circuit constituted by a first voltage-controlled current source of positive transconductance having a first controllable current multiplier connected to its output and a second series circuit including a voltage-controlled current source of negative transconductance having a second controllable current multiplier connected to its output, the output of the said first controllable current multiplier and the input of the said second voltage-controlled current source being interconnected to form the said second gyrator port, the output of the said second controllable current multiplier and the input of the said first voltage-controlled current source being interconnected to form the said first gyrator port, and at least one capacitor leakage current circuit connected between one of the gyrator ports and the input of the voltage-controlled current source coupled to the other port and including at least a third controllable current multiplier, a first control current circuit which for setting the circuit quality factor Q is connected to a control input of the said third controllable current multiplier, and a second control current circuit which for setting the resonant frequency $f_o$ is connected to a control input common to the said first and second controllable current multipliers.

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## 3,921,103
## CIRCUIT ARRANGEMENT FOR FREQUENCY-DIFFERENTIAL PHASE MODULATION

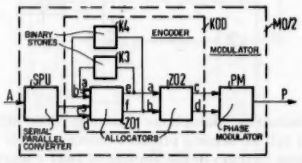
**Erich Burger, Unterpfaffenhofen, Germany, assignor to Siemens Aktiengesellschaft, Berlin & Munich, Germany**

**Filed Apr. 18, 1974, Ser. No. 462,031**

**Claims priority, application Germany, May 15, 1973, 2324542**

**Int. Cl.[2] H03K** *13/22*

**U.S. Cl. 332—11 D** **5 Claims**




1. Apparatus for frequency differential phase modulation of data signals in the form of binary words and by means of which carrier frequencies are phase modulated such that the smallest increment in phase difference between two phase modulated carriers is produced by one bit of a binary word, comprising: encoder means having a number $n$ inputs and a number $n$ outputs, these being $2^n$ stages of phase modulation, said encoder means being constructed to assume one of $2^n$ stable conditions in dependence on which of said $n$ inputs receive binary data and to produce from said $n$ outputs code words arranged in a dual code if said binary data applied to said $n$ inputs is in the Gray code,

buffer register means having inputs coupled to said $n$ outputs of said encoder means and

a plurality of phase modulators coupled to outputs of said buffer register means for supplying phase-modulated carrier frequencies as functions of said code words.

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## 3,921,104
## ADJUSTABLE EQUALIZERS USEABLE IN AUDIO SPECTRUM

**Kenneth James Gundry, London, England, assignor to Dolby Laboratories, Inc., New York, N.Y.**

**Filed Nov. 18, 1974, Ser. No. 524,827**

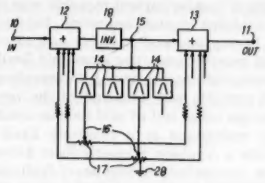
**Claims priority, application United Kingdom, Nov. 19, 1973, 53514/73**

**Int. Cl.[2] H03H** *7/16*

**U.S. Cl. 333—28 R** **20 Claims**

1. A signal equalizer, comprising a signal path extending from an input terminal to an output terminal, two series-connected combining circuits in said path, a plurality of band-pass filters having their inputs connected to a point between the two combining circuits, a plurality of potentiometers individual to the filters and having adjustable taps, the outputs of the filters being connected to the adjustable taps respectively, and the two ends of each potentiometer being connected to the combining circuits respectively to contribute two signal components to the signal passing from the input terminal to the output terminal, which components are equal at an intermediate setting of the potentiometer, and the relative phases of the signals throughout the equalizer being such that the two signal

components contributed by each potentiometer boost the signal passing from the input terminal to the output terminal




at one combining circuit and cut this signal at the other combining circuit.

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**3,921,105**

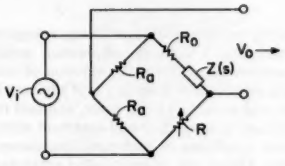
## VARIABLE ATTENUATION EQUALIZER

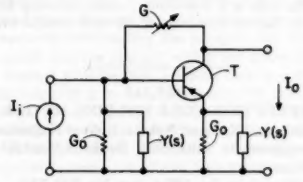
**Franc Brgelz, Kanata, Canada, assignor to Northern Electric Company Limited, Montreal, Canada**

**Filed June 24, 1974, Ser. No. 481,963**

**Int. Cl.[2] H03H** *7/14*

**U.S. Cl. 333—28 R** **9 Claims**




**1.** An adjustable attenuation equalizer comprising:

a pair of input terminals for connecting an input signal voltage $V_i$ thereto;

a pair of output terminals for connecting an output signal voltage $V_o$ therefrom;

a plurality of fixed impedances including a pair of equal impedances $Z_a(s)$, a complex frequency variable impedance $Z(s)$ which is a function of complex frequency variable $(s)$, and a reference impedance $Z_o(s)$; and

a variable impedance $Z_r(s)$;

the impedances being connected in a bridge configuration with the imput terminals connected to one pair of diagonally opposite corners, and the output terminals connected to the other pair of diagonally opposite corners, of the arms of the bridge, the equal impedances $Z_a(s)$ being connected between the pair of the input terminals in two adjacent arms, the complex frequency variable impedance $Z(s)$ and the reference impedance $Z_o(s)$ being serially connected in a third arm, and the variable impedance $Z_r(s)$ in a fourth arm; and in accordance with the relationship:

$$T(s) = \frac{1 - (y)H(s)}{1 + (y)H(s)}$$

where

$T(s)$ = the transfer function of the equalizer,

$(y) = Z_r(s)/Z_o(s)$,

$H(s) = 1/(1 + Z(s)/Z_o(s))$, and

$-Z_o(s) \leq Z_r(s) \leq Z_o(s)$.

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**3,921,106**

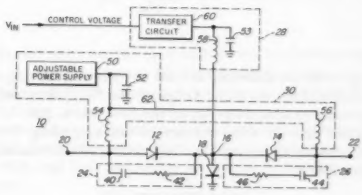
## ATTENUATOR IMPEDANCE CONTROL

**Heyward Sturges Williams, Amherst, N.H., assignor to LRC, Inc., Hudson, N.H.**

**Filed June 28, 1974, Ser. No. 484,254**

**Int. Cl.[2] H01P** *1/22*; **H03H** *7/24*

**U.S. Cl. 333—81 R** **5 Claims**




**1.** A variable attenuator system for providing variable attenuation of an input signal in response to a control signal while automatically maintaining a predetermined characteristic impedance comprising:

first and second variable resistance series diodes and a variable resistance shunt diode, each of said diodes including first and second electrodes, said first electrodes of said series diodes and second electrode of said shunt diode being directly connected together at a common junction;

said second electrodes of said first and second series diodes being connected, respectively, to an input terminal and output terminal;

first and second impedance stabilizing circuits connected in parallel with said first and second series diodes, respectively, each of said stabilizing circuits including an impedance matching the predetermined characteristic impedance, and means for blocking flow of direct current and passing the signal to be attenuated received at said input terminal;

a bias circuit for establishing a voltage bias on said second electrodes of said series diodes; and

a control circuit connected to said junction for providing a control voltage for controlling conduction of said shunt diode.

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**3,921,107**

## ELECTRO-MAGNETIC RELAY

**Hans-Werner Reuting; Klaus-Dieter Wahnschaffe, both of Peine, and Hugo Eggers, Eltze, all of Germany, assignors to ELMEG Elektro-Mechanik GmbH, Peine, Germany**

**Filed June 25, 1974, Ser. No. 483,052**

**Claims priority, application Germany, June 30, 1973, 2333484**

**Int. Cl.[2] H01H** *51/22*

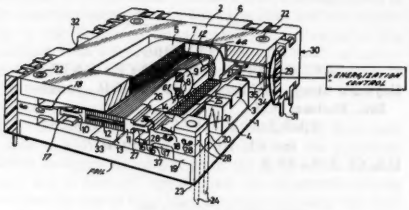
**U.S. Cl. 335—78** **32 Claims**

**1.** An electromagnetic relay comprising a first and second planar flat yoke, each yoke being of quadrilateral construction with four legs facing each other in pairs across a central opening of the respective yoke;

means for mounting the first and second yoke in superimposing and spaced apart relation, whereby each leg of one

of the yokes is in registry with a leg of the other yoke in the direction of superimposing;

a coil, a coil carrier and an armature mounted between the yokes and extending in the central openings, the two yokes as mounted in spaced apart relation establishing a frame, the coil, coil carrier and armature being inside of that frame, the armature being mounted for pivoting on an axis;



magnet means including at least one permanent magnet and disposed for magnetic coupling the two yokes and functioning as spacers between the two yokes; and

contact springs with contact pieces extending from the means for mounting for cooperation with contacts on the armature.

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**3,921,108**

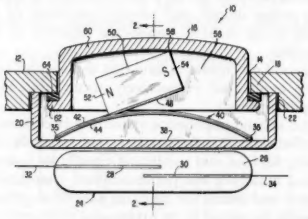
**PUSHBUTTON FOR SOLID STATE WRISTWATCH**

**Arthur H. O'Connor, Lancaster, Pa., assignor to Time Computer, Inc., Lancaster, Pa.**

**Filed June 20, 1974, Ser. No. 481,331**

**Int. Cl.[2] H01H** *1/66*

**U.S. Cl. 335—153** **13 Claims**



1. A wristwatch comprising a watch case, a magnetic field responsive switch in said case, said switch comprising a pair of electrical contacts lying in at least substantially parallel planes, a permanent magnet mounted on said case in a first position adjacent said switch contacts where the polarization of said magnet is oriented at an acute angle relative to the planes of said contacts, and means on said case responsive to manual pressure for moving said permanent magnet by both rotation and translation into a second position closer to said switch contacts where the polarization of said magnet is at least substantially parallel to the planes of said contacts.

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**3,921,109**

**CIRCUIT-INTERRUPTER**

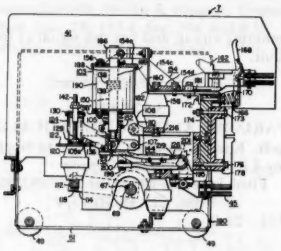
**Alfred W. Hodgson, Orchard Park, N.Y., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.**

**Filed June 20, 1974, Ser. No. 481,562**

**Int. Cl.[2] H01H** *77/10*

**U.S. Cl. 335—195** **19 Claims**

1. A circuit-interrupter including separable contacts at least one of which is movable, a movable operating stem supporting and operating said movable contact, a movable contact-operating arm having a pivotal operating connection with said movable operating stem, means pivotally mounting said movable contact-operating arm at a second stationary pivot-point, means defining a reverse-current movable arm also pivotally mounted on said first pivotal connection, flexible conducting strap-means having one end movable and electrically connected to said movable operating stem, said flexible conducting strap-means additionally having an actuating portion affixed to and movable with one end of the reverse-current movable arm, the other end of said flexible conducting strap means being maintained in a relatively fixed position to thereby provide a repulsion magnetic force between the legs of the reverse current-loop during heavy-fault-current conditions, operating means capable of being energized and de-energized including a contact-compression spring and an abutment member for effecting the rotation of said pivotally mounted movable contact-operating arm adjacent its free end about the second stationary pivot point, and said reverse-current movable arm bearing upon said abutment member during non-energized conditions of said operating means, whereby weld-breaking forces are magnetically generated about a fulcrum point at said first pivotal connection, and whereby in the energized condition of the operating means there is no contact between the abutment member and the reverse-current movable arm and additional contact-closing forces are generated at the reverse-current flexible conducting strap-means.



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**3,921,110**

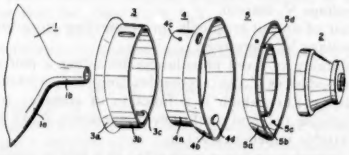
**DEFLECTION YOKE HOLDING DEVICE**

**Hirokazu Ishii, and Katsumi Nakata, both of Nagaoka-Kyoshi, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan**

**Filed Sept. 24, 1974, Ser. No. 508,735**

**Int. Cl.[2] H01F** *7/00*

**U.S. Cl. 335—210** **4 Claims**



1. A deflection yoke device comprising:

a first holding member having a cylindrical part, one end of which is fixed to an outer surface of a color cathode ray tube;

a second holding member having a spherical surface which is fixed to a deflection yoke; and

a third holding member having a cylindrical part which is capable of matingly sliding along said cylindrical part of said first holding member, and having a spherical surface

which is plied on and mates with said spherical surface of said second holding member;

whereby said spherical surface of said second holding member is guided on said spherical surface of said third holding member so as to permit said deflection yoke to be rotated about its central axis and said cylindrical part of said third holding member is guided upon said cylindrical part of said first holding member so as to permit said deflection yoke to be moved in a direction parallel to said axis.

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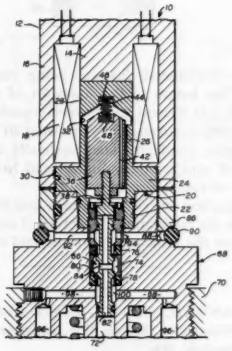
## 3,921,111
## SOLENOID ACTUATOR FOR HIGH PRESSURE VALVE

**Slawomir Kowalski, Rockaway, N.J., assignor to Marotta Scientific Controls, Inc., Boonton, N.J.**

**Filed Sept. 25, 1974, Ser. No. 509,048**
**Int. Cl.[2] H01F 7/08**
**U.S. Cl. 335—255** **12 Claims**



1. A solenoid for controlling high pressure fluid including a coil, a core in the coil, a plunger that moves longitudinally toward and from the core, a tubular plunger guide of magnetizable material surrounding the plunger, the interior of the plunger guide and the plunger within the guide being in position for contact with the high pressure fluid in a closed system when the solenoid is in use, and means for compressing the core and the plunger guide longitudinally with a prestressing force on said core and said plunger guide in a direction counter to the direction of tension stress imposed on the plunger guide by entrance of the high pressure fluid into the plunger guide whereby the prestressing force offsets some of said tension stress.

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## 3,921,112
## COOLING RADIATOR FOR FLUID COOLED POWER TRANSFORMERS AND THE LIKE

**Alvin Y. Broverman, Versailles, Ky., assignor to Kuhlman Corporation, Troy, Mich.**

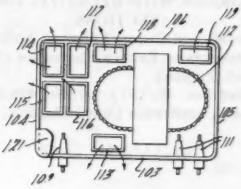
**Continuation-in-part of Ser. No. 435,329, Jan. 21, 1974, abandoned, which is a continuation of Ser. No. 122,931, March 10, 1971, abandoned. This application Apr. 2, 1974, Ser. No. 457,268**
**Int. Cl. H01f 27/10**
**U.S. Cl. 336—58** **7 Claims**

1. A radiator for a tank which includes a wall with an opening therein and which is adapted to enclose a transformer or the like submerged in a cooling fluid, comprising:

a plurality of parallel-sided, rectangular open-ended tubes in parallel relation and with spaces between said tubes communicating with the tank interior for providing passages for said cooling fluid;

a shroud surrounding said tubes and spaced therefrom to provide a flow passage for said cooling fluid, said shroud forming a closure for sealing said opening of said wall of said tank, said tubes being arranged in a linear row;

means at the opposite ends of said shroud and tubes sealing said cooling fluid passages comprising laterally outwardly bent portions at the ends of said tubes with said bent end portions being in abutting relation along the edges and welded thereto to seal said cooling fluid passages between said tubes, and inwardly bent portions at the ends of said



shroud adjacent the tube ends being in abutting engagement with the outwardly bent portions of adjacent tube sides and welded thereto to seal the cooling fluid passage between the tubes and shroud, and;

first bar means secured to one side of said tubes for fixing the tubes in spaced relationship whereby said shroud, tubes and first bar means are joined to provide said closure.

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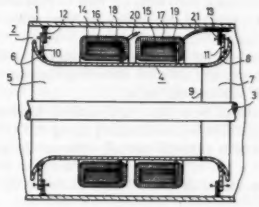
## 3,921,113
## SINGLE-CONDUCTOR TRANSFORMER FOR HIGH-VOLTAGE INSTALLATIONS

**Heinz Schiemann, Berlin, Germany, assignor to Siemens Aktiengesellschaft, Munich, Germany**

**Filed May 17, 1974, Ser. No. 470,903**
**Claims priority, application Germany, May 17, 1973, 2325450**
**Int. Cl.[2] H01F 15/04**
**U.S. Cl. 336—84** **10 Claims**



1. A single-conductor transformer for installation and use in a fluid-insulated, high-voltage installation comprising a metal enclosure, a grounded metal shielding tube member having rounded end-faces and being disposed inside the metal enclosure; first mounting means disposed at one end of said tube member attaching the same to the metal enclosure, said first mounting means comprising a first fastening shoulder coupled to and extending from said tube member at said one end thereof, and a fastening projection coupled to and extending from the inner wall of the metal enclosure, said fastening shoulder being connected to said fastening projection; second mounting means disposed at the other end of said tube member in engagement with said inner wall of said enclosure supporting said tube member with respect to the metal enclosure, said second mounting means comprising a second fastening shoulder coupled to and extending from said tube member at said other end thereof, and a support element disposed in engagement with the inner wall of said enclosure, said second fastening shoulder being connected to said support element

supporting said tube member within said enclosure; at least one transformer core unit including an iron core, and a secondary winding system mounted on said iron core; and third mounting means mounting said transformer core unit on said tube member whereby said tube member supports said transformer core unit within the metal enclosure.

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**3,921,114**

## TRANSFORMER WITH RELATIVELY MOVABLE SECTIONS

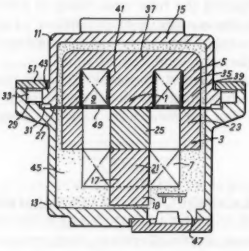
**Alan R. Bridewell, and George F. Eames, both of Mile Cross, England, assignors to Eastern Electronics (Norwich) Limited, Norwich, England**

**Filed Nov. 30, 1973, Ser. No. 420,629**

**Claims priority, application United Kingdom, Nov. 30, 1972, 55384/72**

**Int. Cl.² H01F *21/02***

**U.S. Cl. 336—90** **8 Claims**



1. A transformer comprising:
- a core of magnetic material consisting of first and second U-shaped sections which are rotatable relative to one another about an axis of the core;
- a primary winding provided on one of said core sections;
- a secondary winding provided on the other of said core sections; and
- a ring-shaped section of magnetic material at the outer part of said core, the axis of said ring-shaped section lying along the axis of said core;
- wherein each of said first and second U-shaped sections comprises a first limb extending along the axis of the core, a body which extends radially outwardly from the first limb, and a second limb which extends in an axial direction from an outer end of said body to the ring-shaped section;
- whereby the core can provide, in each position assumed by one core section relative to the other during rotation about said axis, a low reluctance magnetic flux generated by an alternating current flowing in one winding to link the other winding and to cause an electromotive force to be induced in that other winding.

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**3,921,115**

## ANCHOR STRIP FOR SECURING A CONDUCTOR IN A TRANSFORMER COIL

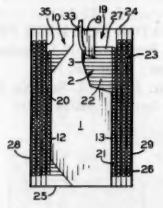
**Saverio Caltagirone, Danville, Ill., assignor to Construction Materials Division General Electric Company, Indianapolis, Ind.**

**Filed Apr. 5, 1974, Ser. No. 458,103**

**Int. Cl.² H01F *15/10***

**U.S. Cl. 336—192** **6 Claims**

1. An electrical coil including an anchor strip for securing a start conductor lead to said electrical coil comprising:
- at least first and second layers of conductor, each of said layers having a pluarality of turns;
- said first layer having fewer turns than said second layer;
- an elongated strip having first and second ends and first and second sides;
- said strip positioned adjacent to and contacting said first layer;
- said strip including a slot having an opening to said second side;
- said slot receiving said start conductor lead of said coil;
- one end of said slot being a predetermined distance from said first end,



- said predetermined distance being equal to or greater than the length of the diameter of the conductor in which said second layer exceeds said first layer so that said strip is substantially resistant to being severed by said start conductor lead especially during the extraction of said start conductor lead from the remaining turns of said coil; and
- a cut out portion on said strip where said first end meets said first side for facilitating extraction of said start conductor lead from the remaining turns of said coil.

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**3,921,116**

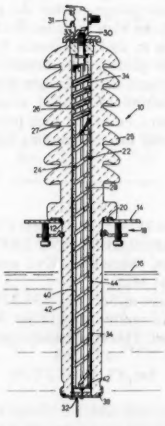
## SAND FILLED - $SF_6$ FUSED BUSHING

**Harvey W. Mikulecky, Racine, Wis., assignor to RTE Corporation, Milwaukee, Wis.**

**Filed Apr. 29, 1974, Ser. No. 465,332**

**Int. Cl.² H01H *85/18***

**U.S. Cl. 337—202** **10 Claims**



1. A fused high voltage electrical bushing for connecting a high voltage cable to an electrical device housed within a casing, said bushing comprising:
- a housing formed of a dielectric material having an axially extending passage,
- an electric terminal sealed to each end of said passage to define a closed chamber,

a fusible assembly within said chamber electrically connected to each of said terminals,
a layer of conductive material on the inside surface of said passage for reducing the voltage stress at the point of entrance of the bushing through the casing,
a granular dielectric material completely filling said chamber,
and an inert gaseous insulating medium completely filling said chamber to minimize the occurrence of corona within said granular dielectric material.

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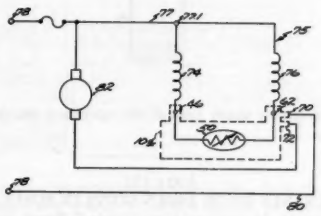
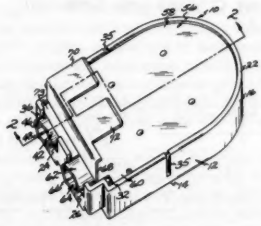
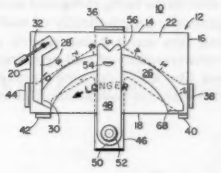
3,921,117
SOLID STATE ELECTRICAL SWITCH
Robert F. Blaha, Dedham, Mass., assignor to Texas Instruments Incorporated, Dallas, Tex.
Filed Nov. 29, 1974, Ser. No. 528,066
Int. Cl.[2] H01C 7/00
U.S. Cl. 338—13 11 Claims

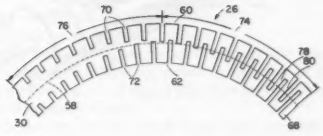




1. A solid state electrical device comprising a cup-shaped casing of dielectric material having a bottom and a sidewall forming a casing chamber having an open end, a first electrically conductive metal terminal means disposed in the casing having a resilient spring portion bearing against said casing bottom and having a connector portion extending through said casing sidewall, a ceramic resistor element of positive temperature coefficient of resistivity disposed within said casing resting on and in electrical engagement with said first terminal means, and a second electrically conductive metal terminal means having a heat-dissipating plate portion closing said open casing end and electrically engaging said resistor element, said second terminal means having at least one tab portion extending through said casing toward said casing bottom and having an enlarged end on said tab portion engaging said casing exteriorly of said casing chamber holding said first and second terminal means pressed resiliently in electrical engagement with said resistor element and securing said terminal means and resistor element with respect to said casing with said first terminal means pressed resiliently against said casing bottom.

3,921,118
VARIABLE RESISTOR ASSEMBLY
Harold J. Ratzlaff, Morrison, Ill., assignor to General Electric Company, Fort Wayne, Ind.
Filed Oct. 1, 1973, Ser. No. 402,120
Int. Cl.[2] H01C 9/02
U.S. Cl. 338—89 24 Claims





1. A variable resistor assembly comprising a substrate member having opposite surfaces and side edges intersecting therewith, a resistance material on one of the opposite surfaces, the resistance material defining a generally serpentine path having a plurality of adjacent legs consecutively interconnected in accordance with a predetermined mathematical relation, means for supporting the other of the opposite surfaces, means on the supporting means for engagement with at least some of the side edges thereby to generally prevent displacement movement of the substrate member generally in the plane of the one opposite surface supported on the supporting means, and means movably mounted on the supporting means for contacting the resistance material in abutting engagement therewith, the abutting engagement of the contacting means with the resistance material urging the other opposite surface toward the supporting means for maintaining the substrate member against displacement therefrom and the contacting means being selectively movable into engagement between adjacent ones of the legs for varying the resistance along the generally serpentine path in accordance with the predetermined mathematical relation.

7. A variable resistor assembly comprising a generally planar substrate member, a resistance material defining a resistance path on the substrate member, and means for supporting the substrate member including means for maintaining the substrate member against displacement generally in its plane on the supporting means, and means movable on the supporting means and generally along the resistance path in contacting engagement with the resistance material for varying its resistance and for maintaining the substrate member against displacement generally from its plane on the supporting means.

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3,921,119
FILM-TYPE CYLINDRICAL RESISTOR
Richard E. Caddock, 640 Sandalwood Court, Riverside, Calif. 92507
Continuation-in-part of Ser. No. 456,474, April 1, 1974, Pat. No. 3,881,162. This application June 24, 1974, Ser. No. 482,524
Int. Cl.[2] H01C 3/08
U.S. Cl. 338—217 22 Claims

1. A film-type resistor, which comprises:

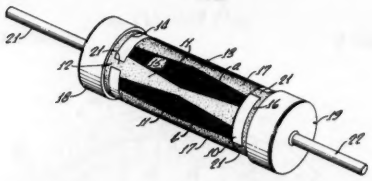
a. an elongated cylindrical substrate,

a. a resistive film provided adherently on the cylindrical surface of said substrate,

c. a plurality of termination film strips formed of conductive material,

said termination film strips being adherently provided in at least partially laminated relationship relative to portions of said resistive film,

said termination film strips being elongated and extending in directions generally longitudinally of said substrate, said termination film strips being spaced relative to each other circumferentially of said cylindrical surface, said termination film strips defining between them at least one resistor element composed of at least part of



said resistive film, and through which currents flow in paths generally circumferential to said substrate,

said resistor element and said termination film strips being so shaped and disposed that said circumferential current paths through said resistor element are relatively long at the central region of said substrate, and relatively short at the end portions thereof, and

d. means to connect one of said termination film strip to one lead and to connect another of said termination film strips to another lead,

whereby when said leads are connected in an electrical power circuit, the amount of electrical heating occurring in said resistive film at said central region of said substrate is substantially less than the amount of such heating occurring at said end portions.

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**3,921,120**

## FLOAT ACTUATED RELEASE MECHANISM

**James W. Widenhofer, Jackson, Mich., assignor to Sparton Corporation, Jackson, Mich.**

**Filed Mar. 29, 1973, Ser. No. 345,871**
**Int. Cl.[2] B63B *21/00*; H04B *11/00***
**U.S. Cl. 340—2** **8 Claims**

**1.** A sonobuoy component deployment system comprising, in combination, a nonbouyant casing having an open upper end and a permanently closed lower end, signal receiving and transmitting apparatus within said casing slidably removable therefrom through said upper end thereof, inflatable float means mounted in said casing adjacent said upper end slidably removable from said casing and located intermediate said casing upper end and said signal receiving and transmitting apparatus, flexible cable means connecting said apparatus to said float means of a length determining the operating depth of said apparatus, releasable retaining means mounted on said casing adjacent said upper end and intermediate said upper end and said float means retaining said float means and apparatus within said casing and permitting said float means and apparatus to deploy from said casing upper end upon said retaining means releasing from said casing, said inflatable float means being located adjacent said retaining means on the opposite side thereof with respect to said casing upper end, float inflating means within said casing for inflating said float means upon said casing being immersed, inflation of said float means releasing said retaining means from said casing wherein release of said retaining means from said casing permits said casing to fall below said float means and deploy said apparatus

from said casing upper end at the operating depth of said apparatus.

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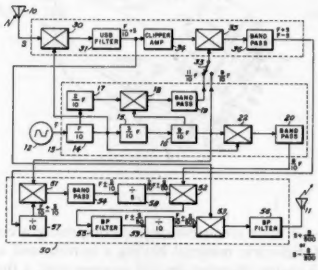
**3,921,121**

## SELECTABLE UP OR DOWN DOPPLER SIMULATOR

**Peter Huisveld, Jr., National City; Claude C. Routh, San Diego, both of Calif., and Milton D. Papineau, Kailua, Hawaii, assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.**

**Filed June 12, 1964, Ser. No. 375,696**
**Int. Cl.[2] G01S *9/66*; G09B *9/00***
**U.S. Cl. 340—3 E** **3 Claims**



**1.** A doppler decoy for receiving a signal $S$ and repeating the signal with a doppler frequency shift of $S/K$ comprising,

a local generator of frequency $F$,

a matrix of frequency multipliers and dividers coupled to said generator for generating and isolating selected decimal fractions of said $F$,

a first modulator for combining said signal $S$ with a first relatively small decimal fraction of $F$,

a second modulator for combining the products of said first modulator selectively with second and third relatively large decimal fractions equally above and below said $F$ to produce the sum and difference products, $F+S$ and $F-S$,

a multiplier-divider logic circuit for successively mixing said $F+S$ and $F-S$ products with said decimal fractions of $F$ and for selecting the side band components of the mixing operations to yield a divided product containing said small fraction of $F$ as well as said $S/K$, and

means for finally combining the divided products with the output of said first modulator to cancel all fraction of said frequency $F$, to yield an output signal $S \pm S/K$.

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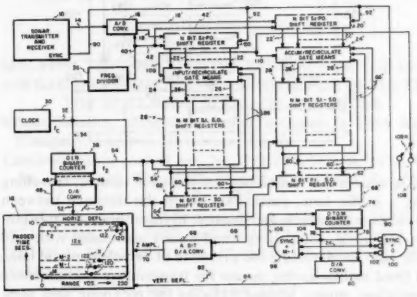
## 3,921,122
## TRACK GENERATOR

**James T. Christoff, Lynn Haven, Fla., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.**

**Filed July 9, 1973, Ser. No. 379,515**
**Int. Cl.[2] G01S 9/66**
**U.S. Cl. 340—3 R** **11 Claims**



1. Apparatus for generating a flicker free, dynamic, historical display fro a source of analog signals provided within predetermined time periods occurring at a first repetition rate, and a source of sync signals directly related to said first repetition rate, said apparatus comprising:

a source of timing signals;

analog to digital converter means, connected to receive said analog signals, for providing signals in the form of binary data bits representative of said analog signals;

first register means, connected to said analog to digital converter means and responsive to said timing signals, for receiving and collecting a group of said binary data bits for each of said predetermined time periods and operative to arrange said binary data bits in each group in parallel form;

second register means, coupled to said first register means and responsive to said timing signals, for accumulating a predetermined number of said groups of parallel binary data bits, said second register means being adapted to have all said binary data groups accumulated therein to be read out non-destructively at a predetermined second repetition rate a plurality of times during each of said predetermined time periods;

third register means, coupled to said second register means and responsive to said timing signals, for effecting sequential reading out of groups of data bits from said second register means and converting each of said groups of binary data bits into series form;

first digital to analog converter means, connected to said third register means, for converting the series binary data bit output of said third register means into analog output signals;

display means, connected to be responsive to said timing signals and to said analog output signals, for generating a visual display of analog values at said second repetition rate, said second repetition rate being substantially greater than said first repetition rate;

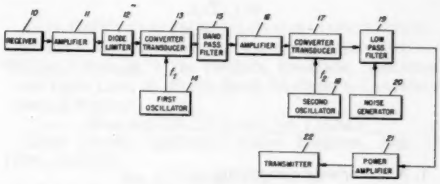
first gate means, coupling said first and second register means, for substituting a new group of binary data bits for the oldest group of binary data bits in said second register means once for each of said predetermined time periods; and

logic means, responsive to said sync signals, for controlling said first gate means.

## 3,921,123
## TORPEDO TARGET SIMULATOR

**Edward W. Early, Seattle, Wash., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.**

**Filed Feb. 2, 1967, Ser. No. 614,531**
**Int. Cl. G01s 9/66**
**U.S. Cl. 340—3 E** **5 Claims**




1. A sonar target simulator comprising

a receiver for receiving sonar signals;

first circuit means coupled to said receiver for generating signals having a frequency equal to the sum of the frequency of the received signal plus that of a first predetermined frequency signal;

first filter means having broad band pass capability connected to said first circuit means;

second circuit means connected to said first filter means for generating signals having a frequency equal to that of the received signal plus that of the first predetermined frequency minus that of a second predetermined frequency signal independent of said first circuit means;

second filter means having broad band pass capability connected to said second circuit means; and

transmitting means connected to said second circuit means for transmitting sonar echo signals.

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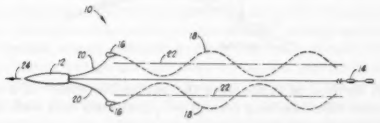
## 3,921,124
## MARINE 3-D SEISMIC METHOD USING SOURCE POSITION CONTROL

**Charles E. Payton, Ponca City, Okla., assignor to Continental Oil Company, Ponca City, Okla.**

**Filed Mar. 18, 1974, Ser. No. 451,736**
**Int. Cl.[2] G01V 1/38**
**U.S. Cl. 340—7 R** **15 Claims**



1. A method for three-dimensional seismic survey over a water-covered land mass, comprising the steps of:

towing a paravane means which includes a seismic energy source means, from a tow vessel along a predetermined line of survey, said paravane means being controlled to proceed in a generally periodic path of pre-determined period about an axis parallel to said line of survey;

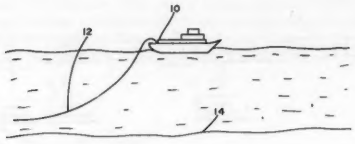
towing a streamer including a plurality of seismic energy receivers behind said tow vessel such that said receivers are positioned along a line a pre-determined distance from said axis; and

controlling periodic energization of said source means and receiving returned seismic energy at said receivers to compile plural related lines of seismic energy trace data from said land mass.

## 3,921,125
## COAXIAL ELECTRET HYDROPHONE

Gerald K. Miller, Saratoga, and Sam Lum, San Jose, both of Calif., assignors to GTE Sylvania Incorporated, Mountain View, Calif.

Filed June 28, 1974, Ser. No. 483,959
Int. Cl.[2] G01V 1/00
U.S. Cl. 340—7 R 4 Claims




1. A hydrophone comprising

a cable having an inner conductor and an outer conductor and a dielectric filler between said conductors, said filler comprising an electret, and

a jacket disposed around said outer conductor,

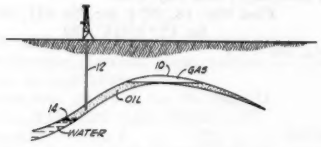
said jacket being elastic whereby to return to the original shape upon removal of an externally applied pressure, said outer conductor being characterized by retention of a mechanical set upon removal of such pressure,

said jacket being permanently secured to said outer conductor whereby to prevent separation of the jacket from the outer conductor upon decrease of said pressure.

## 3,921,126
## METHOD OF SEISMICALLY DELINEATING THE PERMEABLE EXTENT OF OIL-CONTAINING FORMATIONS

Kenneth H. Waters, Ponca City, Okla., assignor to Continental Oil Company, Ponca City, Okla.

Filed Aug. 21, 1974, Ser. No. 499,388
Int. Cl.[2] G01V 1/00
U.S. Cl. 340—15.5 CP 10 Claims




1. A method of delineating the permeable extent of a subterranean oil-containing formation penetrated by a well bore comprising the steps of:

conducting a first seismic survey of said formation to obtain a first set of data representing reflections of seismic signals therefrom;

introducing gas in said formation through said well bore whereby said gas is caused to flow into and through permeable portions of said formation, said gas having the characteristic of increasing the reflection of seismic signals from said formation when present therein;

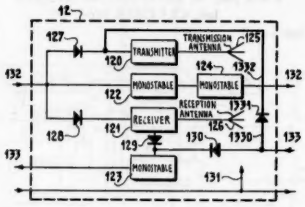
conducting a second seismic survey of said formation after the introduction of said gas therein to obtain a second set of data representing reflections of seismic signals therefrom; and

comparing said first and second sets of data to identify changes in the reflections of seismic signals obtained in said second survey thereby delineating the locations of said gas in said formation and the permeable extent thereof.

## 3,921,127
## VEHICLE DANGER INDICATING SYSTEM

Jean-Raymond Narbaits-Jaureguy, and Henri Billottet, both of Paris, France, assignors to Thomson-CSF, Paris, France

Filed Dec. 5, 1974, Ser. No. 529,942
Claims priority, application France, Dec. 7, 1973, 73.43762
Int. Cl.[2] G08G 1/00
U.S. Cl. 340—32 16 Claims

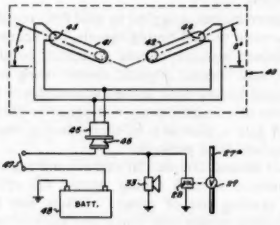



1. A system for indicating danger to a vehicle, travelling along a traffic lane, particulary when the distance between said concerned vehicle and another in front thereof is substantially lessening, comprising fixed means associated with said traffic lane for detecting the presence of vehicles on said lane, said fixed means having means for transmitting said presence information, means aboard vehicles for receiving said presence information and deriving therefrom whether said presence information comes from a vehicle in front of said concerned vehicle and means for generating a safety signal when said presence information as a pulse is within a signal of predetermined length corresponding to a predetermined safety distance from said concerned vehicle.

## 3,921,128
## TRUCK ROLL WARNING SYSTEM

Edwin deS. Snead, Box 798, Georgetown, Tex. 78626

Filed May 28, 1974, Ser. No. 473,511
Int. Cl.[2] B60Q 5/00; G08B 21/00
U.S. Cl. 340—52 H 5 Claims




1. In a vehicle having a dump bed, a single acting extensible hydraulic cylinder for raising and lowering said dump bed, and a hydraulic system including a reservoir and power pump for extending said cylinder to raise said bed; a warning system comprising:

an electrically operated signal device; a control circuit for said signal device including a switch unit responsive to lateral tilt of said vehicle in either direction;

said switch unit including a housing defining a vertical reference plane and a horizontal reference plane, and a pair of elongated, linear mercury switch tubes supported in said housing parallel to said vertical reference plane and being oppositely inclined at a selected angle relative to said horizontal reference plane;

said switch unit being mounted on said bed to dispose said vertical reference plane in a plane generally perpendicu-

lar to the longitudinal axis of the axis of the vehicle and to dispose said horizontal reference plane in a plane generally parallel to the vehicle supporting surface, when said bed is in its lowermost position;

each switch tube being responsive to lateral tilt of the vehicle at an angle greater than a selected horizontal reference angle of the switch tubes, in a respective direction, to actuate said signal device;

the selected reference angles for said tubes in the lowermost position of said bed being less than the critical angle of tilt for the vehicle with the bed in said lowermost position; and the angle of said tubes relative to a horizontal plane decreasing as said bed is raised, to respond to a lesser angle of tilt of the vehicle.

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## 3,921,129

## MALFUNCTION PREVENTIVE SYSTEM FOR USE IN AN AIR BAG INCORPORATING A SENSOR FOR DETECTING THE COLLISION SPEED OF A VEHICLE

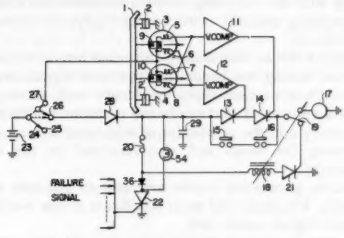
**Shizuo Sumida, Hiroshima, Japan, assignor to Toyo Kogyo Company, Limited, Hiroshima, Japan**

**Continuation-in-part of Ser. No. 251,209, May 8, 1972, Pat. No. 3,830,329. This application Mar. 14, 1973, Ser. No. 341,195**

**Claims priority, application Japan, May 10, 1971, 46-37234; Mar. 18, 1972, 47-27613; Mar. 15, 1972, 47-31230[U]; Mar. 15, 1972, 47-31231[U]; Mar. 15, 1972, 47-31232[U]**

**Int. Cl.² B60R** *21/08*

**U.S. Cl. 340—52 H** **17 Claims**




**6.** A malfunction preventive system for use in an air bag system incorporating a sensor for detecting a collision speed of a vehicle, comprising:

an electrical power source;

a fuse;

an electrical sensor means for generating a collision signal and consisting of a coil and a magnet;

a priming or ignition plug adapted to actute said air bag;

a first switching means connected to said coil of said electrical sensor means and adapted to be turned ON in response to said collision signal from said electrical sensor means;

a relay having a switching device with ON and OFF positions, said switching device being connected in series with said electrical power source, said first switching means and said plug and operative to turn ON or OFF the electrical connection of said plug with said first switching means, and an electric magnet adapted to bring said switching device to the ON position, said electric magnet of said relay being connected via said fuse to said electrical power source;

a failure detecting means for detecting failures in at least said electrical sensor means, said priming or ignition means, and said first switching means and generating a failure signal;

a second switching means adapted to be actuated in response to said failure signal from said failure detecting means, whereby said fuse will be blown when said second switching means is activated;

a simulation means adapted to feed a simulation signal similar to said collision signal to said coil of said electrical sensor means, prior to the starting of said vehicle; and

a third switching means adapted to be actuated in response to said simulation signal and forming a circuit by being connected via said fuse and said electric magnet of said relay to said electrical power source.

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## 3,921,130

## ANTI-THEFT SYSTEM EMPLOYING COINCIDENCE SWITCH WITH EASILY-CHANGED COMBINATION

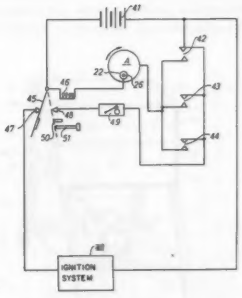
**William O'Donnell, 7 The Paddock, Freshfield, Lancashire, and Leslie Carr, 36, Huntly Road, Liverpool 6, Lancashire, both of England**

**Filed Aug. 25, 1971, Ser. No. 174,862**

**Claims priority, application United Kingdom, Aug. 27, 1970, 41194/70**

**Int. Cl.² B60R** *25/10, 25/04*

**U.S. Cl. 340—64** **1 Claim**




**1.** An anti-theft system comprising an electric circuit which includes at least one switch to be operated by a closure member, a relay having a coil to be energized by operation of said switch and having contact means with an alarm whereby operation of said relay will cause operation of said alarm, and a single manually operable coincidence switch having selectable positions of coincidence in circuit between said one switch and said relay and having a particular position of coincidence in which it renders the anti-theft system inoperative, said coincidence switch including two manually rotatable dials each having corresponding characters for setting against datum points, one of said dials being positioned externally of said coincidence switch and intended for access externally of the enclosure to be protected, a contact pin connected to one of said dials for movement therewith, a circular contact plate connected to the other of said dials for rotation therewith and being in contact with said contact pin, said plate having a small portion of insulating material whereby when said dials are set to correspond said contact pin bears against said portion of insulating material so that said coincidence switch is in an 'off' condition, whereas when the setting of said two dials do not correspond said contact pin makes contact with said contact plate to complete a circuit through the switch and render the system operative, said coincidence switch comprising a tubular housing, a front cover positioned on said housing, said one of said dials being rotatably positioned in said front cover, means for manually rotating said one dial whereby any character of said dial can be set against said datum point, said plate being a metal disc having said small portion of insulating material therein and being drivingly connected with said one of said dials, said metal disc being connected in the electrical circuit of the anti-theft system by means of a terminal device associated therewith, a disc of

insulating material carrying said contact pin which is metal and is connected electrically by means of a further terminal device in the circuit of the anti-theft system, a spring loaded plate urging said contact pin into rubbing contact with said metal disc, a stem on said disc carrying said contact pin, said stem being connected with the other of said dials being positioned at the opposite end of said housing to said one dial, and means for locating said other dial in any selected position of adjustment.

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**3,921,131**

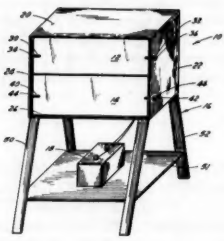
## TRAFFIC SIGNAL BOX

**Gerard A. M. Buono, 1595 Sauve St., Est. Apt. 41, Montreal, P. Que., H2C 2A9, Canada**

**Filed Jan. 2, 1974, Ser. No. 430,255**

**Int. Cl.[2] G08B 5/14**

**U.S. Cl. 340—139** **10 Claims**



1. A traffic signal box for race-tracks comprising:

a hollow housing having a substantially flat front wall, the said front wall comprising two superposed panels pivotally mounted about their median axis, the said axes being parallel with each other,

motor means for moving said panels from a closed position to an opened position,

a first linking means pivotally mounted to said motor means and a first one edge portion of one of said panels so as to rotate the said one panel until it shows the rear surface of the said one panel to a first viewer, the said front one edge portion being vertically outside one of the median axes, a second linking means pivotally mounted to a second edge portion of said one panel on the other side of its said one median axis and to the edge portion of the other panel adjacent the said second edge portion to rotate the said other panel in a direction opposite the said one panel until it shows the rear surface of the said other panel to said front viewer, the said box being characterized by the fact that the front surface of the panels has one color and the inner and outer surfaces of the rest of the housing, including the rear surface of the panels, have a single other color which is contrasting with the color of the front surface of the panels, whereby the color of the front surface of the panels is adapted to provide a visual signal when closed, the said signal disappearing when the panels are rotated and the rear surface of the panels appears to the front viewer to blend with the color of the said rest of the housing.

**3,921,132**

## DIGITAL RECORDING APPARATUS ESPECIALLY FOR TELEVISION SIGNALS

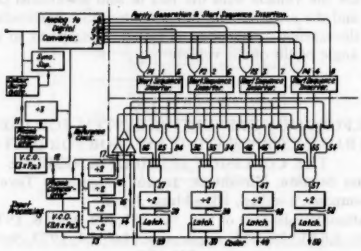
**John Lewis Edwin Baldwin, Croydon, England, assignor to Independent Broadcasting Authority, London, England**

**Filed Aug. 22, 1973, Ser. No. 390,376**

**Claims priority, application United Kingdom, Aug. 24, 1972, 39605/72**

**Int. Cl.[2] G06F 11/10**

**U.S. Cl. 340—146.1 AG** **7 Claims**



1. A recording apparatus for forming on a recording medium a recording of a series of digital words, each word consisting of a number of word bits and each word bit of a word having a different significance from the other bits of said word, onto a recording medium, said apparatus comprising a plurality of recording heads arranged to be in recording relationship with the recording medium simultaneously to form a corresponding plurality of recording tracks, and a recording circuit having

1. means for so distributing the word bits of each digital word among the heads that the most significant of the word bits of each digital word are each received by a different one of said heads and recorded on the medium thereby and the remainder of said word bits are divided among the heads and also recorded on the medium thereby,
2. parity generating means arranged to generate a set of parity bits from said most significant of the word bits of each digital words, and
3. means for distributing the set of parity bits among the heads for recording on the medium thereby, together with the word bits, in a distribution such that the parity bits of said set received and recorded by any one head are derived exclusively from those of said most significant bits received and recorded by the other heads.

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**3,921,133**

## CONTROLLABLE TIMING DEVICE FOR SIGNALLING THE END OF AN INTERVAL

**Ronald G. Pink, Franklin, Mass., assignor to Honeywell Information Systems Inc., Waltham, Mass.**

**Filed Dec. 7, 1970, Ser. No. 95,734**

**Int. Cl.[2] G06F 7/02**

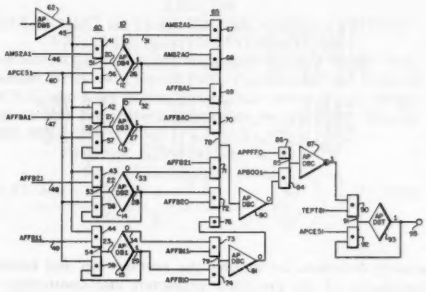
**U.S. Cl. 340—146.2** **2 Claims**

1. Apparatus for generating a measure of a predetermined interval following the occurrence of a start-indicating signal and for signalling the end of said interval by delivering an end-indicating signal said apparatus being employed with a system generating a plurality of control signals wherein the state of said plurality of control signals varies cyclically, comprising in combination:

means for generating said start-indicating signal independently of said end-indicating signal and at a time different from the time of delivering of said end-indicating signal; a store for receiving a plurality of input signals at input terminals thereof, for storing a representation of the state of the plurality of input signals received thereby, and for

delivering a set of output signals having a state corresponding to said representation;

selective transfer means provided with an input control terminal coupled to receive said start-indicating signal, said transfer means being coupled to receive said plurality of control signals and being coupled to the input terminals of said store for transferring the control signals received thereby to said input terminals upon the occurrence of said start-indicating signal; and



a comparator provided with an output terminal, said comparator being coupled to receive said plurality of control signals and being coupled to said store to receive said set of output signals, said comparator for selectively comparing the state of only a portion of said plurality of control signals with the state of only a portion of said set of output signals and delivering said end-indicating signal at said output terminal when the portions of the two states compared thereby satisfy a predetermined relation, said predetermined relation being equality.

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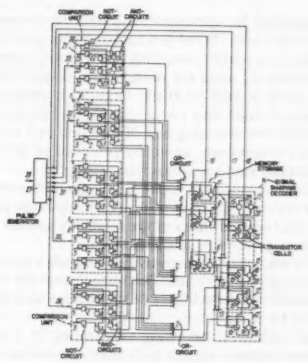
## 3,921,134
## DIGITAL COMPARATOR WITH MULTIPLE REFERENCES

**Alexei Andreevich Myagkov, ulitsa Spartaka, 5, kv. 17; Mikhail Grigorievich Raigorodsky, ulitsa Gvardeiskaya, 20, kv. 85; Viktor Nikolaevich Uchakin, ulitsa Spartaka, 6, kv. 8; Ivan Ivanovich Khomyakov, prospekt Stroitelei, 64, kv. 3, and Boris Sergeevich Yastrebo, ulitsa Gvardeiskaya, 22a, kv. 18, all of Saratov, U.S.S.R.**

**Filed Feb. 13, 1974, Ser. No. 442,143**
**Int. Cl.[2] G06F** *7/02*
**U.S. Cl. 340—146.2** **2 Claims**

**1.** Series-parallel electronic comparator comprising units for comparing equal-order digits of an input discrete value with reference discrete values, each unit having inputs being fed with similar digits of the input discrete value and the reference discrete values; a digit transfer bus for said input discrete value; digit transfer buses for said reference discrete values; NOT-circuits in each said unit for comparing equal-order digits, the input of the first NOT-circuit being connected to said digit transfer bus of the input discrete value, and the input of each of the remaining NOT-circuits being connected to each said digit transfer bus of a respective reference discrete value; a first group of AND-circuits in each said unit for comparing equal-order digits, each AND-circuit having a first and a second input and an output; a second group of AND-circuits in each said unit for comparing equal-order digits, each AND-circuit having a first and a second input and an output; said AND-circuits in said first group having the first inputs thereof connected to the outputs of respective of said remaining NOT-circuits, said second inputs thereof being combined and connected to said digit transfer bus of the input discrete value, said AND-circuits in said second group having the first inputs thereof connected to said digit transfer buses for transferring the digits of respective reference discrete values and the second inputs thereof being combined and connected to the output of said first NOT-circuit, the input thereof being connected to said digit transfer bus of the input discrete value; a first group of OR-circuits for transferring the comparison result when said digit of said input discrete value is represented by a logic 1 and said digit of said reference discrete value, by a logic 0; a second group of OR-circuits transferring the comparison result when said digit of said input discrete value is represented by a logic 0, said digit of said reference discrete value, by a logic 1; said OR-circuits in said first group having their inputs connected to said outputs of said AND-circuits in said first group; said OR-circuits in said second group having their inputs connected to said outputs of said AND-circuits in said second group; memory elements for storing comparison results, each having writing, reading and inhibit inputs, and inhibit inputs being connected to the outputs of respective of said OR-circuits in the first group, and the writing inputs being connected to the outputs of respective of said OR-circuits in the second group; a decoder for generating an output signal according to comparison results, said

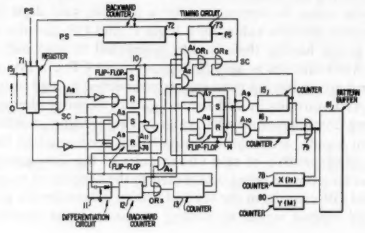


decoder comprising a group of inhibit AND-circuits, each having first and second writing inputs, first and second reading inputs, an inhibit input and an output, a group of OR-circuits, each having two inputs and an output, said inputs of said inhibit AND-circuits and said inputs of said OR-circuits of said decoder being coupled to said outputs of said memory elements so that said output of each of said memory elements is connected directly to said first writing input of said respective inhibit AND-circuit and through said series-connected OR-circuits to said inhibit inputs of all succeeding of said inhibit AND-circuits of said decoder; a plurality of control buses for receiving synchronizing clock pulses, some of said control buses being coupled to said respective units for comparing equal-order digits, each said bus being coupled to each said unit for respectively comparing equal-order digits, one of said control buses further being connected to said reading inputs of all of said memory elements, and the remaining of said control buses being respectively connected to said combined first and second reading inputs and to said combined second writing inputs of all of said inhibit AND-circuits in said decoder for generating an output signal according to comparison results; and a clock-pulse generator for synchronizing operation of said series-parallel electronic comparator, said clock-pulse generator including one starting input and a plurality of outputs, each being connected to one of said control buses respectively.

## 3,921,135
## APPARATUS AND METHOD FOR MEMORIZING DOT PATTERNS IN A MEMORY SYSTEM

**Takeshi Komaru, Tokyo, and Toshio Shimamura, Yokohama, both of Japan, assignors to Fujitsu Limited, Kawasaki, Japan**

**Filed Apr. 17, 1973, Ser. No. 351,971**
**Claims priority, application Japan, Apr. 18, 1972, 47-038925**
**Int. Cl.[2] G06K** *15/00*
**U.S. Cl. 340—146.3 MA** **8 Claims**



1. Apparatus for decompressing data representative of an image divided into (M/*m*×N/*n*) relatively large area portions, each large area portion assuming a first or second state dependent respectively upon the presence or absence of the image therein, each of said relatively large area portions of a first state being divided into (*m*×*n*) smaller portions, each of the smaller portions assuming one of said first and second states, dependent respectively upon the presence or absence of the image therein, said apparatus comprising:

means for providing a sequence of signals indicative of the first and second states of the relatively large portions and first and second states of the relatively smaller portions of each large portion of the first state;

bistable means responsive to those signals representative of the large portions of the first state to provide a first output and to the large portions of the second state to provide a second output;

storage means for receiving and storing in a defined, expanded manner signals indicative of whether each of the (M × N) small portions is in the first or second state;

first counter means responsive to the first output of said bistable means for facilitating the application of (*m*×*n*) signals from said providing means indicative of the first and second states of the smaller portions of a larger portion indicated by said bistable means to be of a first state, to said storage means; and

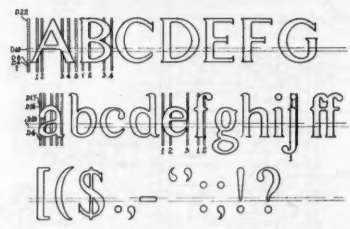
second counter means responsive to the second output of said bistable means for applying (*m*×*n*) signals indicative of the second state to said storage means, whereby signals indicative of the state of each of the (M × N) smaller portions is stored in said storage means.

## 3,921,136
## AUTOMATIC PATTERN RECOGNITION METHOD AND APPARATUS PARTICULARLY FOR OPTICALLY RECOGNIZING CHARACTERS

**Hillel Bar-Lev, 35 Haim Vital St., Jerusalem, Israel**

**Filed Jan. 12, 1973, Ser. No. 323,332**
**Claims priority, application Israel, Jan. 21, 1972, 38603**
**Int. Cl. G06k** *9/12*
**U.S. Cl. 340—146.3 H** **19 Claims**

1. Apparatus for the automatic recognition of alphanumeric characters, comprising a single line of detectors extending continuously in the direction of the height of the characters to be recognized; certain of said detectors being high and low limit sensing detectors; means optically-projecting a line of characters on the line of detectors; means effecting relative movement between said line of detectors and said characters in the direction of the width of the characters, whereby said line of detectors scans each character along a plurality of parallel single lines extending continuously in the direction of the height of the character; means for sampling all the detectors each time a predetermined detector senses a change in sign in its scanned portion of the character to produce sample electrical data signals; a recognition circuit receiving said electrical data signals for recognizing the characters therefrom; and normalizing means including said high and low limit

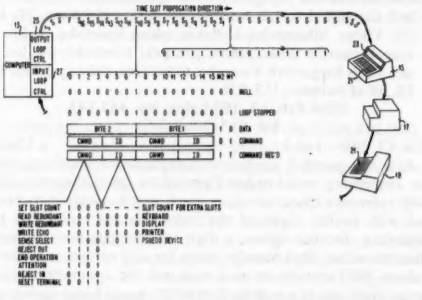


sensing detectors for sensing the average top and bottom boundaries of the projected characters and controlling in accordance therewith the alignment and size of said optically-projected characters with respect to said line of detectors, said normalizing means including alignment means effecting relative displacement between the line of detectors and the optically projected characters to align one of said boundaries with respect to its limit sensing detector, and size-control means controlling the size of said optically-projected characters to align the other of said boundaries with respect to its limit sensing detector.

## 3,921,137
## SEMI STATIC TIME DIVISION MULTIPLEX SLOT ASSIGNMENT

**Carl Meade McClearn, Jr., Kingston, and Thomas Alva Edison Miller, Red Hook, both of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.**

**Filed June 25, 1974, Ser. No. 482,940**
**Int. Cl. H04j** *3/00;* **H04q** *9/00*
**U.S. Cl. 340—147 R** **12 Claims**



1. A data transmission system comprising:

a central controller;

a plurality of remote terminals;

means providing a loop signal path between said central controller and each of said remote terminals in a multiplexed sequence of time slots, at least one different time slot being associated with each of said remote terminals;

control means at said central controller for transmitting a load slot count command and a slot count from said central controller to a remote terminal;

command decode means at said remote terminal for storing said slot count in response to said load slot count command;

comparator means at said remote terminal for comparing a number of slots counted by a slot counter with said stored slot count and actuating said terminal to transmit and receive in a slot whenever the slots counted is equal to said stored slot count;

whereby said slot is associated with said terminal.

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**3,921,138**

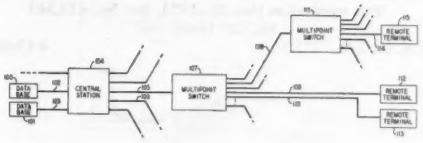
## MULTIPOINT DATA COMMUNICATIONS SYSTEMS UTILIZING MULTIPOINT SWITCHES

**Gary Joseph Burns, Atlantic Highlands; Edward Arthur Mohlenhoff, Bricktown; Gerald Philip Pasternack, Colts Neck, all of N.J., and Gary Wayne Strong, Ann Arbor, Mich., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.**

**Filed Nov. 14, 1974, Ser. No. 523,576**

**Int. Cl.[2] H04Q** *5/00*; **H04J** *3/04*

**U.S. Cl. 340—147 R** **27 Claims**




1. In a multipoint data communications system, a multipoint switch including means responsive to each of a plurality of polling signal sequences on a signaling path from a central station for extending the signaling path to a selected one of a plurality of remote terminals, the multipoint switch further including means responsive to the polling sequence for blinding the multipoint switch to signals on the signaling path, characterized in that the blinding means further includes means for unblinding the multipoint switch in response to the absence of signals on the signaling path for a predetermined interval.

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**3,921,139**

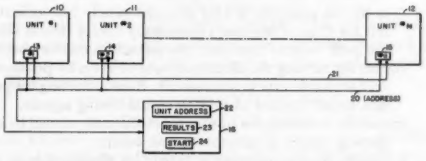
## TEST SYSTEM HAVING MEMORY MEANS AT TEST MODULE

**Samuel J. Hardesty, Jr., Linthicum, and Raymond A. Lloyd, Laurel, both of Md., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.**

**Filed Mar. 8, 1974, Ser. No. 449,589**

**Int. Cl.[2] H04Q** *9/00*

**U.S. Cl. 340—152 R** **3 Claims**




1. A test module for use as a subsection of a complex test system, said module comprising:

a. test means for testing the apparatus associated with said module by comparing a digital signal indicative of the operational status of said apparatus to a digital signal stored in a memory which is part of said test module;

b. gating means for gating the results of tests performed on said apparatus by said test means to a results bus;

c. decoding means for receiving first and second identification signals from a test console via an address bus, said decoding means including apparatus for decoding said first identification signal to generate a signal which initiates said test means such that said test means performs predetermined tests on said associated apparatus and for decoding said second identification signal to generate a second signal which gates the results of said test to said console via said results bus; wherein

d. said first and second identification signals are coded such that a plurality of said modules can communicate with a single test console by time sharing said results and address buses.

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**3,921,140**

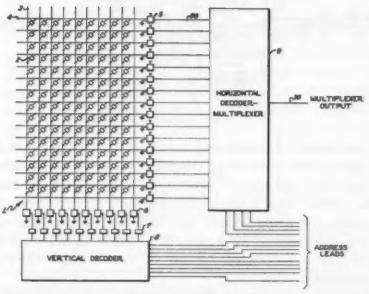
## ALARM SCANNER APPARATUS AND METHOD

**Randie M. Houston, Fairfax, and Harold G. Wilson, Jr., Woodbridge, both of Va., assignors to Computer Sciences Corporation, El Segundo, Calif.**

**Filed May 16, 1974, Ser. No. 470,681**

**Int. Cl.[2] H04Q** *9/00*

**U.S. Cl. 340—166 R** **10 Claims**




1. Apparatus for detecting the presence of alarm conditions comprising a matrix of alarm sensing means which change state when an alarm condition is sensed, said matrix comprising a set of horizontal conducting elements and a set of vertical conducting elements, said alarm sensing means corresponding to each cross-over point of said elements, each of said sensing means corresponding to a matrix crosspoint including switch means connected between the horizontal and vertical elements which define matrix crosspoints, means, including counting means, for sequentially scanning said sensing means at each of said matrix crosspoints, means responsive to a scanned sensing means being in said changed state for stopping said scanning at the matrix crosspoint at which a change state occurs and providing a readout of the position in said matrix of said changed state sensing means, and means for starting said scanning again after said readout has occurred.

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**3,921,141**

## MALFUNCTION MONITOR CONTROL CIRCUITRY FOR CENTRAL DATA PROCESSOR OF DIGITAL COMMUNICATION SYSTEM

**John A. Wilber, Elk Grove Village; Rolfe E. Buhrke, La Grange Park, and Verner K. Rice, Wheaton, all of Ill., assignors to GTE Automatic Electric Laboratories Incorporated, Northlake, Ill.**

**Filed Sept. 14, 1973, Ser. No. 397,567**

**Int. Cl.[2] G06F** *11/00*, *11/06*

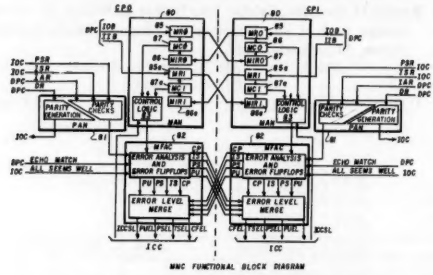
**U.S. Cl. 340—172.5** **7 Claims**

1. In a data processing system having first and second central data processors each operating synchronously and including processing circuits and maintenance circuits, said system being adapted wherein only one of said processors is active at one time and the other is standby, and further including first and second storage means, each provided with its own bus and

adapted for selective communication with said data processors, said data processors each including a storage register for said storage means, the improvement comprising:

timing generator circuit means for generating at least two separate sequential mutually exclusive timing level signals; malfunction monitor circuit means in each of said central processors for detecting and isolating malfunctions in said system and including:

match network circuit means receiving first sets of data signals responsive to said mutually exclusive timing level signals from the data processing circuits of its own central processor and receiving second sets of data signals responsive to said mutually exclusive timing level signals from the data processing circuits of the other central



MNC FUNCTIONAL BLOCK DIAGRAM

processor for comparing said first and second sets of data signals and generating mismatch error level signals when said first and second sets of data signals do not match;

first malfunction analysis circuit means responsive to said mismatch error signals, and said mutually exclusive, timing level signals for generating output signals representative of a suspected circuit of said system causing the mismatch; and

parity network circuit means receiving signals transmitted to and received from said external storage means for checking the parity thereof and for generating parity error signals in response to a detected parity error; and

wherein said malfunction analysis circuit is further responsive to said parity error signals.

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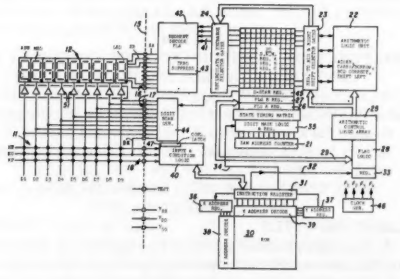
## 3,921,142
## ELECTRONIC CALCULATOR CHIP HAVING TEST INPUT AND OUTPUT

**John D. Bryant, Houston, and Glenn A. Hartsell, Dallas, both of Tex., assignors to Texas Instruments Incorporated, Dallas, Tex.**

**Filed Sept. 24, 1973, Ser. No. 400,299**
**Int. Cl.[2] G06F *11/00***
**U.S. Cl. 340—172.5** **7 Claims**



1. a semiconductor chip for providing the functions of a calculator, comprising a read-only-memory for storing a large number of instruction words, circuit means connected to receive instruction words from the read-only-memory and having outputs, control means for defining the operation of the calculator, the control means having inputs connected to outputs of the circuit means, address register means for defining a location in the read-only-memory, characterized in that a test mode of operation of the calculator is provided wherein operation is different from operation in the calculate mode, means connecting one of the terminals of the semiconductor chip to the address register means to permit reading in to the address register means a specific address from an external source, and means connecting another of the terminals of the semiconductor chip to said circuit means for reading out to external utilization means an instruction word from the read-only-memory.--

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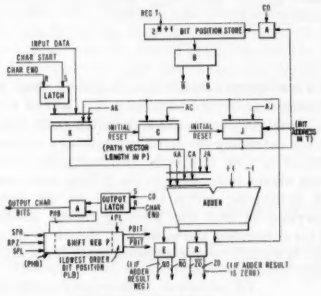
## 3,921,143
## MINIMAL REDUNDANCY ENCODING METHOD AND MEANS

**Luther Jay Woodrum, Poughkeepsie, N.Y., assignor to International Business Machines Corporation, Valhalla, N.Y.**

**Continuation of Ser. No. 213,604, Dec. 29, 1971, abandoned.**
**This application Dec. 26, 1973, Ser. No. 428,543**
**Int. Cl.[2] G06F *3/00***
**U.S. Cl. 340—172.5** **4 Claims**



1. Apparatus for generating a set of electrical signals representing a minimal redundancy code from inputted electrical signals representing a sequence position of a current input character in a character set, comprising

a clock device generating electrical timing signals,

a scanable article in said apparatus formed with a sequence of bit positions, in which each bit position is settable to one of two electrical states, one electrical state being an inner vertex state and a second electrical state being a sink state, wherein the sequence of said electrical states in the bit positions of said scanable article can indicate a left list scan of minimal redundancy binary tree in which the path vectors represent the output character codes,

means for sensing the electrical state of each bit position in said scanable article sequentially from a starting bit position under control of said electrical timing signals,

means for counting the sink states electrically sensed by said sensing means to generate a sink count,

a register device receiving a "zero" bit electrical state in a low-order bit position when an inner vertex state is detected by said sensing means to thereby increase the length of a current path vector in said register device by one bit position,

means for detecting the electrical state of the bit positions in the current path vector in said register device, beginning with its lowest-order path vector bit position, when a sink state is detected by said sensing means,

means for deleting from the current path vector in said register device each electrical "one" bit state found by

said detecting means to be contiguous from the lowest-order bit position in the current path vector, the path vector remaining in said register device having an electrical "zero" state in its lowest-order bit position,

means for changing the electrical state of the lowest-order bit position in said path vector in said register device to an electrical "one" bit state,

and means for outputting the path vector setting in said register device when the sink-count in said counting means reaches an electrical state controlled by the sequence position for the current input character.

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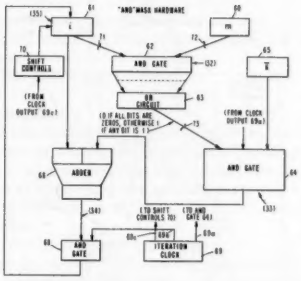
## 3,921,144
## ODD/EVEN BOUNDARY ADDRESS ALIGNMENT SYSTEM

**Luther J. Woodrum, Poughkeepsie, N.Y., assignor to International Business Machines Corporation, Valhalla, N.Y.**

**Continuation of Ser. No. 144,497, May 18, 1971, abandoned. This application Dec. 26, 1973, Ser. No. 428,178**

**Int. Cl.[2] G06F** *9/20*

**U.S. Cl. 340—172.5** **2 Claims**




1. A system for controlling an index register which contains contents in addressable units for accessing a table, comprising index register means for containing a binary field representing the number of addressable units in an entry length in said table,

means for providing a mask field identifying the position of the lowest-order 1 bit in said index register,

means for signalling a 0 or 1 value of a bit in the index register at a bit position identified by said mask field,

and means for adjusting the content of said index register if said bit position tested by said signalling means finds a 1 value,

whereby the content of said index register is adjusted for the generation of a next index value.

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## 3,921,145
## MULTIREQUEST GROUPING COMPUTER INTERFACE

**Michael Gene Emm, Sierra Madre, and Dongsung Robert Kim, El Monte, both of Calif., assignors to Burroughs Corporation, Detroit, Mich.**

**Filed Oct. 12, 1973, Ser. No. 406,115**

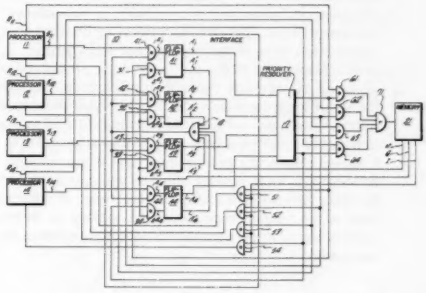
**Int. Cl.[2] G06F** *3/00, 13/00*

**U.S. Cl. 340—172.5** **4 Claims**

1. An interface between a plurality of requestors and a requestor priority resolving network servicing a responder, the requestors being capable of emitting signals representing the desire for a response, addresses within the responder and information and the responder being capable of emitting signals representing readiness to transmit, information and the end of the information, and the priority resolving network being capable of effectuating sequencing of requestor address-information signals on input lines, one corresponding to each requestor, by energizing its output lines, one corresponding to each requestor, comprising:

means responsive to a responder ready signal and a set of requestor response-desired signals made up from at most one from each requester to energize corresponding priority resolving network inputs;

means responsive to a responder ready signal to inhibit operation of said energizing means such that a subsequent




set of requestor response-desired signals do not affect priority resolving network inputs until all members of a present set are services by the responder; and

means responsive to priority resolving network output signals to return a responder information signal to the corresponding requestor.

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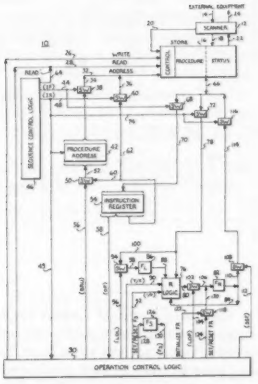
## 3,921,146
## PROGRAMMABLE DATA PROCESSOR AND CONTROLLER SYSTEM

**William J. Danco, Roanoke, Va., assignor to General Electric Company, Salem, Va.**

**Continuation-in-part of Ser. No. 321,260, Jan. 5, 1973, abandoned. This application June 17, 1974, Ser. No. 480,112**

**Int. Cl.[2] G06F** *9/16*

**U.S. Cl. 340—172.5** **8 Claims**




1. An improved programmable controller for controlling equipment, simulating a control circuit having sequenced opening and closing of electrical switches, said controller comprising:

a. a store having located therein a plurality of first and second type information items,

1. each of said first type information items having an operation code portion identifying one of a prescribed number of types of logic operations and logic conditions, and further including an address portion identifying a location in said store containing an input logic

condition, the state of which specifies the status of the logic condition identified by the first type information items representing a logic string, and

2. each of said second type information items identifying the end of a logic string and a location in said store;

b. a variable state accumulator

c. means to successively access said store to retrieve said information items;

d. means to initialize said accumulator in accordance with the type of logic operation identified by the first accessed information item of the represented logic string;

e. means responsive to the operation code portion of a then accessed information item of the first type, the state of the input logic condition identified by said then accessed information item and the then existing state of said accumulator to establish a new state of said accumulator; and,

f. means responsive to a second type of information item to store the then existing state of said accumulator at a location identified by said second type of information item as an output logic condition serving to develop a control signal to be provided from said controller to said equipment.

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## 3,921,147
## ECG INSTRUMENT

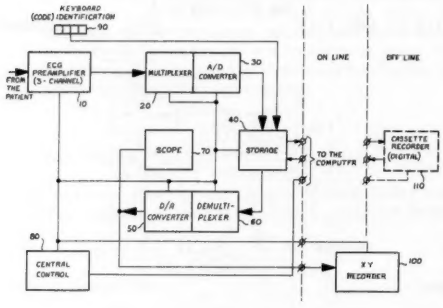
**Günter Fuhr, Germering, Germany, and Heinz Reetz, deceased, late of Munich, Germany (by Hildegard Reetz, heir), assignors to Fritz Schwarzer GmbH, Munich, Germany**

**Filed Feb. 11, 1974, Ser. No. 441,084**

**Claims priority, application Germany, Oct. 11, 1973, 2351167**

**Int. Cl.² G06F** *3/05, 3/14*

**U.S. Cl. 340—172.5** **6 Claims**




1. An ECG computer terminal system for interfacing between ECG equipment and a computer, said equipment being used for monitoring heart activity of at least one patient, said computer being used to analyze said monitored heart activity, said system comprising means for amplifying electrical analog signals from said equipment, first means for converting said analog signals to digital signals, means for temporarily storing said digital signals, second means for providing other analog signals corresponding to said stored digital signals while not removing said digital signals from said temporary storing means, means for viewing said other analog signals to determine quality of said other analog signals and thereby determine quality of said stored digital signals, manual keyboard control means connected to said temporary storing means for eliminating certain of said digital signals from said temporary storing means, and means for transferring other of said digital signals from said temporary storing means to the input of said computer.

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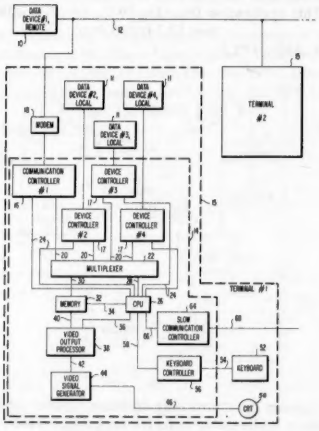
## 3,921,148
## BUSINESS MACHINE COMMUNICATION SYSTEM AND DATA DISPLAY

**David Ophir, Melville; Marvin Shapiro, Huntington, and Bruce Komusin, Middle Island, all of N.Y., assignors to Ontel Corporation, Plainview, N.Y.**

**Filed Mar. 6, 1974, Ser. No. 448,759**

**Int. Cl.² G06F** *7/00, 11/00*

**U.S. Cl. 340—172.5** **27 Claims**




1. In a data display system including a plurality of business machines each having a central processing unit, a data memory, a plurality of device controllers each adapted for connection to a data device, and a multiplexer connected to the memory and to the device controllers, permitting multiplexed transfer of data between the data devices and the memory under control of the central processing unit, with at least one of the data devices coupled to its associated device controller on a party line in which each such associated business machine is assigned an address, each part line data device generating an attention character indicative of an impending transfer of data and generating at lesast one address character indicative of the address of the business machine with which the data transfer is to take place, the improvement comprising;

means within each device controller for detecting the attention character to activate the device controller for the transfer of data therethrough;

means within each device controller responsive to activation of the device controller for transferring through the multiplexer to the data memory characters received on the party line subsequent to the attention signal;

means within the central processing unit responsive to activation of the device controller for interpreting the address characters transferred to the data memory; and

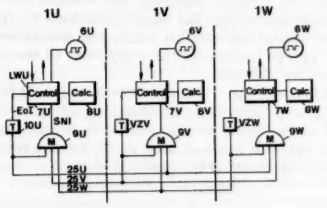
means within the central processing unit responsive to interpretation of an address signal indicative of an address other than the address of the business machine to deactivate the device controller associated with the party line data device transmitting such address.

3,921,149

## COMPUTER COMPRISING THREE DATA PROCESSORS

Werner Kreis, Bern, and Peter Laderach, Munsingen, both of Switzerland, assignors to Hasler AG, Bern, Switzerland

Filed Mar. 26, 1974, Ser. No. 454,854
Claims priority, application Switzerland, Mar. 28, 1973, 4379/73
Int. Cl.[2] G06F *15/16*
U.S. Cl. 340—172.5 3 Claims




1. A computer comprising a memory and three data processors connected to said memory and simultaneously executing identical instructions,

each of said processors including

a clock,

a calculating unit,

a control unit connected to receive clock pulses from said clock and connected to control said calculating unit, and synchronizing means connected to said three data processors for synchronizing the respective processor with the two other processors at the end of the execution of each instruction,

each synchronizing means including

a. pulse generating means having an output delivering a first pulse at the end of the execution of each of said instructions,

b. a majority gate having three inputs each connected to the output of said pulse generating means of said control unit of one of said data processors, and having an output delivering a second pulse on the simultaneous receipt of one of said first pulses on at least two of said three inputs of said majority gate, and

c. starting means connected to said output of said majority gate and starting the execution of the following instruction on reception of said second pulse.

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3,921,150

## THREE-RANK PRIORITY SELECT REGISTER SYSTEM FOR FAIL-SAFE PRIORITY DETERMINATION

James H. Scheuneman, St. Paul, Minn., assignor to Sperry Rand Corporation, New York, N.Y.

Filed Sept. 12, 1974, Ser. No. 505,434
Int. Cl.[2] G06F *3/00*
U.S. Cl. 340—172.5 5 Claims

1. A fail-safe priority system, comprising:

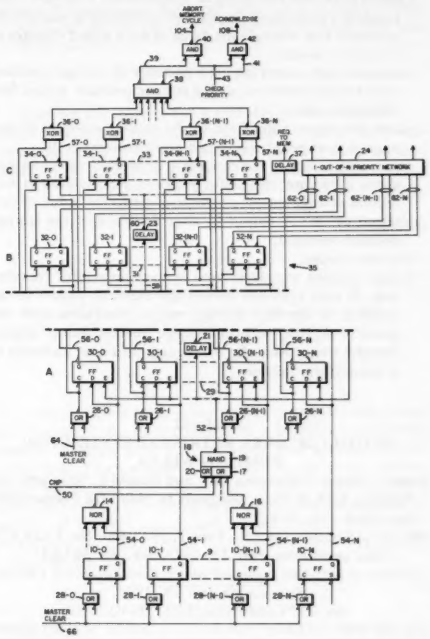
a receiving register comprised of N request receive FFs for receiving priority request signals;

a three-rank holding register comprises of three priority select registers A, B and C each of which is comprised of N priority select FFs;

means for coupling the output of each of said N request receive FFs as an input to the like-ordered priority select FF of said priority select registers A, B and C;

means successively coupling an enabling signal to the N priority select FFs of said priority select registers A, B and C for gating the priority request signals received by the request receive FFs of said receiving register into the like-ordered priority select FFs of said priority select registers A, B and C at successive delay periods;

means coupled to the outputs of the like-ordered priority select FFs of said priority select registers A and C for generating a signal when the states of any of the like-ordered priority select FFs of said priority select registers A and C are different.

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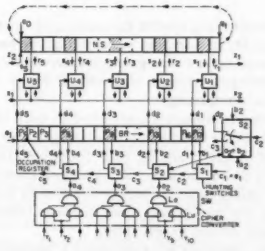
3,921,151

## APPARATUS FOR ENCIPHERING TRANSMITTED DATA BY INTERCHANGING SIGNAL ELEMENTS OF THE TRANSMITTED DATA WITHOUT OVERLAPPING OR OMITTING ANY ELEMENTS WITHIN THE TRANSMITTED SIGNAL TRAIN

Gustav Guanella, Zurich, Switzerland, assignor to Patelhold Patentwerwertungs- & Elektro-Holding AG, Glarus, Switzerland

Division of Ser. No. 154,851, June 21, 1971. This application July 12, 1973, Ser. No. 378,570
Int. Cl.[2] G06F *7/00*
U.S. Cl. 340—172.5 17 Claims




1. Apparatus for transposing signal elements within a signal train comprising first storage means having a plurality of storage positions each capable of storing a signal element; input means for sequentially supplying each element of said

signal into each storage position at a predetermined uniform rate;

a signal generator operating in synchronism with said input means for generating signals each occurring at said predetermined rate wherein the value of each signal changes in a random manner;

second storage means having a plurality of storage positions each being associated with a storage position in said first storage means;

means for altering the state of the storage position in said second storage means at said predetermined rate;

means responsive to the randomly generated values of said signal generator output for selecting the position in said second storage means corresponding to the value of said signal generator output to alter the state of the storage position selected;

read-out means;

means coupled to said second storage means for transferring to said read-out means the element stored in the position of the first storage means associated with the position in the second storage means being altered thereby transposing the arrangement of said elements in a nonuniform fashion.

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## 3,921,152
## AUTOMATIC DATA RETRIEVAL SYSTEM FOR PUMPING WELLS

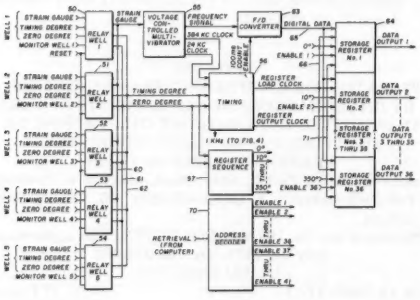
**James L. Hagar, Oklahoma City, and Harold E. Schwartz, Jr., Norman, both of Okla., assignors to Mobil Oil Corporation, New York City, N.Y.**

**Division of Ser. No. 258,756, June 1, 1972, Pat. No. 3,824,851. This application July 23, 1973, Ser. No. 381,847**

*Disclosure was also published under Trial Voluntary Protest Program on Jan. 28, 1975.*

**Int. Cl.[2] G06F** *3/04, 3/05;* **H04Q** *9/02*

**U.S. Cl. 340—172.5** **7 Claims**




1. A well monitoring system for measuring operating conditions at a plurality of pumping wells of the type having a crank shaft and a sucker rod string and means to reciprocate the sucker rod string to operate a downhole pump as the crank shaft revolves, comprising:

a. at least two transducers connected to each of said pumping wells, a first transducer generating a load signal representative of the changing load conditions on the sucker rod string during pumping and a second transducer generating a timing pulse at least once during each pumping stroke of the sucker rod string representative of the rate of rotation of said crank shaft,

b. a central computer for generating a plurality of monitor commands, each monitor command identifying a selected one of said pumping wells, and a retrieval command, and

c. a remote terminal unit coupled to said transducers and to said central computer, comprising:

1. a frequency-to-digital converter,

2. a digital storage unit connected to the output of said frequency-to-digital converter,

3. means responsive to each of said monitor commands for selectively connecting the first transducer at the pumping well identified by a monitor command to said frequency-to-digital converter and the second transducer at the same pumping well to said digital storage unit, whereby the load signal from the selected pumping well is converted to a digital signal by the frequency-to-digital converter and whereby the timing signal from the selected pumping well enables the digital storage unit to store the digital signal from the frequency-to-digital converter at a data rate dependent upon the rate of rotation of the crank shaft of the selected pumping well, and

4. means responsive to said retrieval command from the computer for enabling the digital signals to be clocked out of the digital storage unit into said computer at a data rate that is independent of the rates of rotation of the crank shafts of the pumping wells.

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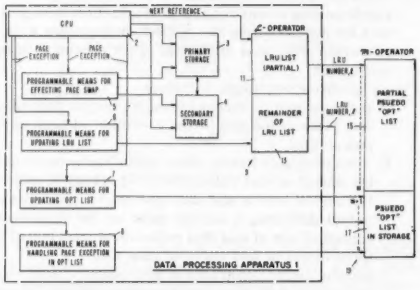
## 3,921,153
## SYSTEM AND METHOD FOR EVALUATING PAGING BEHAVIOR

**Laszlo A. Belady, Yorktown Heights, and Robert I. Roth, Briarcliff Manor, both of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.**

**Filed Aug. 2, 1973, Ser. No. 385,222**

**Int. Cl.[2] G06F** *13/00*

**U.S. Cl. 340—172.5** **9 Claims**


NEXT REFERENCE
CPU
PAGE EXCEPTION
PRIMARY STORAGE
SECONDARY STORAGE
PROGRAMMABLE MEANS FOR EFFECTING PAGE SWAP
PROGRAMMABLE MEANS FOR UPDATING LRU LIST
PROGRAMMABLE MEANS FOR UPDATING OPT LIST
PROGRAMMABLE MEANS FOR HANDLING PAGE EXCEPTION IN OPT LIST
LRU LIST (PARTIAL)
REMAINDER OF LRU LIST
PARTIAL PSUEDO "OPT" LIST
PSUEDO "OPT" LIST IN STORAGE
DATA PROCESSING APPARATUS 1

1. A system for use in data processing apparatus which is operated as a paging machine and wherein a program is considered as a page reference string, for determining the minimum memory capacities for the pages of said string, said data processing apparatus including means for maintaining a first list of the names of the pages of said program weighted in accordance with a least recently used (LRU) criterion, said first list being constituted by the names of said pages and LRU integers respectively therewith having one of the different discrete values of 1 to $n$, wherein n is equal to the total number of said pages in said program, said system comprising:

means for maintaining a second list of said names, said second list being constituted by an ordered sequence of $n$ addresses, each of said addresses respectively having one of the different discrete values of 1 to $n$, there being located at each of said addresses, a different integer, C, associated therewith from which the minimum memory capacity (MMC) of said page can be determined, each of the integers in said second list having a different discrete value of 1 to $n$;

means responsive to said means for maintaining said second list for determining said minimium memory capacity (MMC) of a given referenced page comprising:

means responsive to the referencing of said given page for dividing said second list into a first group of addresses having the values of 1 to ($l$-1) respectively, and a second

group of addresses having the values of *l* to *n* respectively, wherein *l* is equal to the integer associated with said referenced page in said first list,

means responsive to said means for dividing said second list for ascertaining the address, *k*, in said second group whereat there is present the lowest value MMC integer;

means responsive to said means for ascertaining said address, *k*, for making the series of addresses in said second group which are included in the subgroup containing addresses *l*, (*l*+1), . . . , (*k*-1) which have the following values, viz. (*l*+*a*), (*l*+*b*), (*l*+*c*), . . . , to address (*k*-1), if necessary, wherein (*l*+*a*) has the smallest address value greater than *l* such that $C(l+a) < C(l)$, wherein (*l*+*b*) has the smallest address value greater than (*l*+*a*) such that $C(l+b) < C(l+a)$, etc., wherein $C(i)$ is the value of integer, C, at location *i*.

means responsive to said means for dividing said second list for generating the smallest missing number in the groiup of integers comprising 2 to ($C_{max}$+1) wherein $C_{max}$ is the largest integer C of those contained at addresses 2 to (*l*-1), said generated smallest missing number being the minimum memory capacity of said referenced page,

means responsive to said means for dividing said second list for incrementing each of the addresses 2 to (*l*−1) of said first group by 1 whereby they respectively have the address values of 3 to *l*,

means responsive to said means for generating said smallest missing number for assigning the address value of 2 to said generated smallest missing number, and

means responsive to said means for marking said series of addresses for assigning to each of the series of said marked addresses, the value of the next address in said series, the highest value address in said series being assigned the value of *k*,

said integer originally at said address k being discarded.

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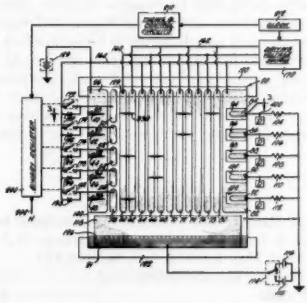
**3,921,154**

## ELECTRIC POLARIZATION DOMAIN DEVICE AND METHOD

**John R. Barkley, Wilmington, Del., assignor to E. I. Du Pont de Nemours and Co., Wilmington, Del.**

**Filed Nov. 9, 1973, Ser. No. 414,250**
**Int. Cl.² G11C** *11/22*
**U.S. Cl. 340—173 MS** **47 Claims**



1. A controlled electric polarization domain device, comprising:

a single crystal of a coupled ferroelastic-ferroelectric material exhibiting uniaxial electric polarization;

means for producing in said single crystal an electric polarization domain region of electric polarization reversed with respect to that of adjacent material of said crystal, at least one portion of which domain: (a) is elongated along a predetermined twinning plane in said crystal, (b) has at least one tip spaced inwardly from that surface of said crystal toward which said tip extends, and (c) extends less than completely across said crystal in a direction perpendicular to said direction of elongation; and

means for producing localized fields in said single crystal adjacent said tip, selectively to control the position of said tip in said crystal.

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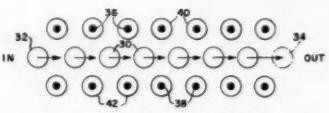
**3,921,155**

## MAGNETIC BUBBLE TRANSMISSION CIRCUIT

**Robert C. Minnick, Houston, Tex.; Paul T. Bailey, Creve Coeur, and Robert M. Sandfort, St. Charles, both of Mo., assignors to Monsanto Company, St. Louis, Mo.**

**Filed Feb. 23, 1973, Ser. No. 335,303**
**Int. Cl.² G11C** *11/14, 19/08*
**U.S. Cl. 340—174 TF** **36 Claims**




1. A magnetic bubble transmission circuit, comprising magnetic boundary means for confining a plurality of adjacent magnetic bubbles in a line including two spaced lines of spaced dots of ferromagnetic material and stationary bubbles formed about said dots respectively to form said boundary means, means for generating a magnetic impulse at one end of said line of bubbles and means for receiving a line bubble ejected from the other end of said line of bubbles in response to said impulse.

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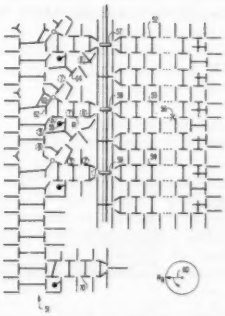
**3,921,156**

## MAGNETIC BUBBLE MEMORY HAVING BY-PASS PATHS FOR DEFECTIVE LOOPS

**Koichi Yoshimi, Tokyo, Japan, assignor to Nippon Electric Company, Ltd., Tokyo, Japan**

**Filed Sept. 7, 1973, Ser. No. 395,093**
**Claims priority, application Japan, Sept. 8, 1972, 47-90739**
**Int. Cl.² G11C** *11/14, 19/08*
**U.S. Cl. 340—174 T** **11 Claims**



1. A magnetic memory apparatus comprising: a magnetic medium capable of holding bubble domains; magnetic means for permitting the domains to stably stay in the magnetic medium; magnetic means for propagating the domains; a plurality of memory loops; a transfer loop comprising; a first and a plurality of second domain propagation paths capable of circulating domains therein, each of said second paths beginning and ending in said first path and constituting a bypass of the part of said first path between said beginning and ending; means for selectively transferring the domains between the first domain propagating path and the plurality of memory

loops to write and read data into or from the memory loops; means for detecting a defect in any memory loops which prevents the domains from propagating; means for operating any of said second domain propagating paths in order to cause the domains to pass therethrough and to avoid the part of said first domain propagating path which leads to the detected defective memory loop.

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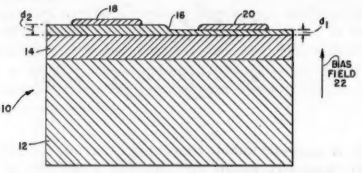
**3,921,157**
**NONUNIFORM SPACING LAYER FOR MAGNETIC BUBBLE CIRCUITS**

**Robert Melvin Sandfort, St. Charles, Mo., assignor to Monsanto Company, St. Louis, Mo.**

**Filed Mar. 27, 1974, Ser. No. 455,219**
**Int. Cl.[2] G11C *11/14***
**U.S. Cl. 340—174 TF** **11 Claims**




1. A bubble chip, comprising a sheet of magnetic bubble material, a nonferromagnetic spacing layer of varying thickness disposed on said sheet, and an overlay pattern of ferromagnetic circuit elements forming a bubble interaction logic circuit disposed on said spacing layer for guiding bubbles in said sheet, said spacing layer having a raised area at a selected location determined by said overlay pattern, said selected location coinciding with the section of said logic circuit where a bubble interaction is designed to take place so as to weaken the magnetic coupling of bubbles in said sheet to said overlay pattern at said selected location.

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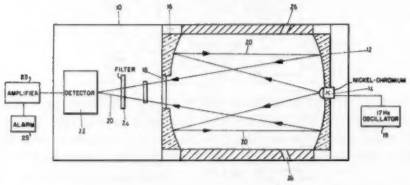
**3,921,158**
**FIRE DETECTORS**

**Quinn Shumway Anderson, 'Goldsand', Twist and Smit Sts., Joubert Park, Johannesburg, Transvaal, South Africa**

**Filed Sept. 10, 1973, Ser. No. 395,747**
**Claims priority, application South Africa, Sept. 13, 1972, 72/6258**
**Int. Cl.[2] G08B *17/10***
**U.S. Cl. 340—237 R** **2 Claims**




1. A fire detector comprising a housing, a source of light energy in the housing adapted to transmit light rays across the housing, the source comprising a lamp having a filament consisting of a thin ribbon of oxidized nickel chromium alloy, means to pulse the filament at a frequency of the order of 17 Hz, at least one opening in the housing through which products of combustion can enter the housing, said products of combustion affecting the intensity of said light rays, a light detector located in the path of the light rays, interference filter means located between the source of light energy and the light detector and adapted to pass to the light detector only the light rays having a wavelength corresponding to one of the characteristic wavelengths of carbon dioxide, and means responsive to the intensity of the light rays impinging on the light detector to operate an alarm.

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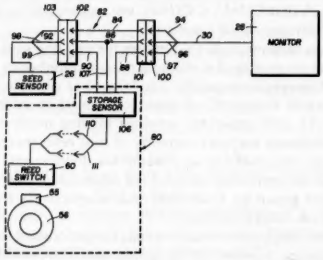
**3,921,159**
**SEED PLANTER HERBICIDE AND INSECTICIDE MONITOR SYSTEM**

**David E. Steffen, Chatham, Ill., assignor to Dickey-john Corporation, Auburn, Ill.**

**Filed Nov. 20, 1974, Ser. No. 525,582**
**Int. Cl.[2] G08B *19/00***
**U.S. Cl. 340—267 R** **13 Claims**




1. A monitor for interconnection with automatic seed planting apparatus having seed dispensing means, seed sensor, and a seed planter monitor interconnected with said seed sensor through a plurality of electrical leads for indicating a malfunction of the seed planting apparatus, and wherein said seed planting apparatus has earth treatment means associated therewith, said monitor comprising: connector means for connection to the plurality of leads between said seed sensor and said seed planter monitor, switch means coupled to said connector means for providing a first switching state during one instance and a second switching state during another instance, said switch means being interposed in one of the electrical leads of said plurality of electrical leads, sensing means for mounting on said earth treatment means, said sensing means including signal means for producing a first signal condition when said earth treatment means is dispensing material and for producing a second signal condition when said earth treatment means fails to dispense material, and circuit means coupled between said sensing means and said switch means for causing said switch means to be in said first switching state during said first signal condition and in said second switching state during said second signal condition, said switching means thereby interrupting the operation of said seed planter monitor when in said second switching state to give an indication that the earth treatment means has failed.

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**3,921,160**
**SERVICE SYSTEM**

**George Irving Ratner, East Orange, N.J., assignor to Automatic Close & Lock Corporation, East Orange, N.J.**

**Filed May 3, 1974, Ser. No. 466,813**
**Int. Cl.[2] G08B *5/00***
**U.S. Cl. 340—286** **5 Claims**

1. A system for controlling the flow of persons to service stations comprising:

a. a waiting area wherein persons wait for a vacancy at a service station;

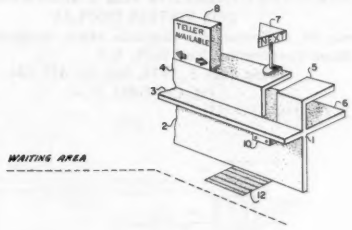
b. a plurality of service stations;

c. director means in front of said waiting area which alerts a waiting person to a vacancy at any service station and directs said person toward a vacant service station;

d. beacon means at each service station which is in a lighted mode when there is a vacancy at said service station; and

e. beacon actuating means at each service station acti-

vated by the person at that station attaining service, consisting of (1) at least one photocell which receives at least a set amount of ambient light when the service station is vacant and thereby controls said beacon actuating means to be in a lighted mode and said director to alert said waiting person, and receives less than said set amount of ambient light when the service station is in use by a previously waiting person, resulting in said beacon means being in an unlit mode and said director in a non-alerting mode and (2) variable resistance means in the photocell circuit for adjusting the photocell signal relative to the intensity of ambient light contacting said photocell so that variations in ambient light intensity do not disrupt said system.

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**3,921,161**

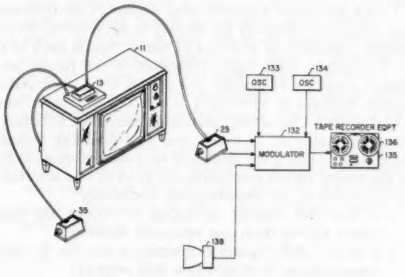
**PREPROGRAMMED TELEVISION GAMING SYSTEM**

**Ralph H. Baer, Manchester, N.H., assignor to Sanders Associates, Inc., Nashua, N.H.**

**Continuation-in-part of Ser. No. 365,000, May 29, 1973, abandoned. This application Feb. 22, 1974, Ser. No. 445,022**

**Int. Cl.² G06F** *3/14*

**U.S. Cl. 340—324 AD** **25 Claims**




1. Apparatus for playing games on the screen of a cathode ray tube comprising:

means for generating on the screen a first spot having a plurality of visible variables associated therewith and representing a first moving game playing object;

means for generating on the screen a second spot having a plurality of visible variables associated therewith and representing a second moving game playing object;

player actuable means for controlling at least one variable of at least one of the spots; and

prerecorded means having control signals recorded thereon in the form of a modulated audio frequency signal for automatically controlling at least one variable of at least one of the spots.

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**3,921,162**

**METHOD OF DRIVING LIQUID CRYSTAL DISPLAY DEVICE**

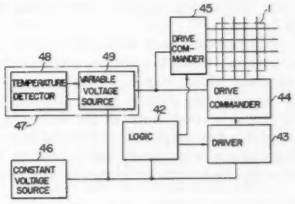
**Masakazu Fukai, Nishinomiya; Seiichi Nagata, Sakai; Komei Asai, Hirakata, and Katsuji Hattori, Uji, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan**

**Filed Apr. 4, 1973, Ser. No. 347,631**

**Claims priority, application Japan, Apr. 6, 1972, 47-34984; June 16, 1972, 47-60806; June 29, 1972, 47-65783**

**Int. Cl.² G09F** *9/32*

**U.S. Cl. 340—324 M** **4 Claims**




1. A method of driving a liquid crystal display device having a matrix structure including a nematic crystal layer and two groups of electrodes disposed on the respective surfaces of said liquid crystal layer, each of the electrodes in said two groups being driven by an associated controller having an inpput and a gating circuit, said method comprising the steps of

applying first and second pulse driving voltages to the inputs of first and second selected controllers, each selected controller being associated with an electrode of one of said two groups to designate a selected electrode position, applying a first a.c. signal voltage having a frequency higher than that of said first or second pulse driving voltages to the inputs of the controllers associated with said two groups of electrodes,

applying a second a.c. signal voltage having a frequency different from that of said first or second pulse driving voltages to the gating circuits of the controllers associated with said two groups of electrodes, said second a.c. signal controlling application of said pulse driving voltages and first a.c. signal to said electrodes,

measuring the temperature adjacent said nematic liquid crystal, and

changing the magnitudes of the voltages applied to all of the electrodes of said two groups to follow changes in the temperature of said liquid crystal layer, said changes in the magnitudes of the voltages applied to said electrodes causing dynamic scattering in said liquid crystal at the changed temperatures thereof at said selected electrode position and suppressing dynamic scattering at the other electrode positions, whereby the temperature range wherein dynamic scattering is produced is widened.

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**3,921,163**

**ALPHA-NUMERICAL SYMBOL DISPLAY SYSTEM**

**Philippe Giraud, and Jacques Marien, both of Paris, France, assignors to Thomson-CSF, Paris, France**

**Filed Feb. 15, 1974, Ser. No. 443,109**

**Claims priority, application France, Feb. 20, 1973, 73.05938**

**Int. Cl.² G06F** *3/14*

**U.S. Cl. 340—324 A** **7 Claims**

1. An alpha-numerical symbol display system for displaying, according to a random scanning, successive vectors represen-

tative of graphic data on a color cathode ray tube with equal and uniform brilliance and a consistent positioning of the trace irrespective of the color scan selected and of the vector length, said system comprising:

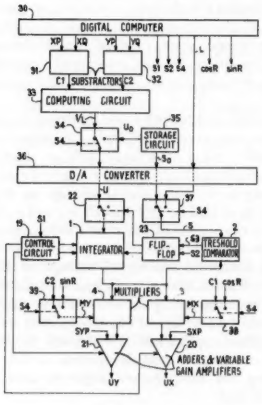
A. a color cathode ray tube with X and Y deflection means;

B. sawtooth generating means for providing a sawtooth signal having a determined and different slope value for each color scan and including an integrator circuit having a determined time constant duration for integrating a reference d.c. voltage to produce a ramp output signal, a comparator circuit for comparing said ramp signal to a threshold d.c. voltage to control said integrator;

C. two multiplying circuits having each two inputs, receiving simultaneously said sawtooth signal at a first input and separate multiplying signals at the second input respectively;

D. two adding circuits each having two inputs, connected in series with said multiplier circuits respectively and receiving separate adding signals at the second input respectively, said adding signals being representative of the initial X and Y coordinates of the vector to display;

E. two variable gain amplifiers connected in series with said adding circuits respectively and providing X and Y deflection signals to said deflection means respectively;




F. generating means for generating said d.c. voltages and further said multiplying signals and adding signals and including switching means for selecting, for each vector, said d.c. voltages and said multiplying signals from a first and a second sets of values corresponding to a first and to a second operation modes respectively, said generating means providing further positioning coordinate signals of the vector in question and which are polar-coordinate signals for the first operation mode and cartesian-coordinate signals for the second operation mode, said generating means comprising further control means for providing control signals in the case of color scan change, on the one hand, to said integrator circuit to change the said slope value by varying its time constant duration and, on the other hand, to said variable gain amplifiers to vary their respective gain in discrete step values, the ratio between the threshold voltage and the reference voltage being proportional to the length of the vector in question whatever the operation mode selected; and

G. a controlled VHT generator for providing to said cathode ray tube different VHT voltages corresponding to said color scans.

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**3,921,164**

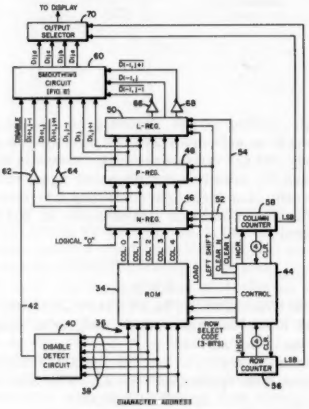
## CHARACTER GENERATOR FOR A HIGH RESOLUTION DOT MATRIX DISPLAY

**Bruce M. Anderson, New Brighton, Minn., assignor to Sperry Rand Corporation, New York, N.Y.**

**Filed June 3, 1974, Ser. No. 475,724**

**Int. Cl.[2] G06F** *3/14*

**U.S. Cl. 340—324 AD** **9 Claims**




1. In a dot-matrix type character display of the type including a read-only memory for storing at addressable locations therein a plurality of matrices of binary signals each M rows by N columns, each signal indicative of the lighted or unlighted condition of discrete dot groups to be displayed on a display medium in presenting a selected character from a subset of such characters, addressing means for selecting one of said plurality of matrices, and row selecting means for sequentially reading out from said read-only memory in parallel the binary signals comprising the rows of said selected one of said matrices, the improvement comprising:

a. a first shift register connected to receive the parallel output signals from said read-only memory;

b. a second shift register connected to receive the parallel output signals from said first shift register;

c. a third shift register connected to receive the parallel output signals from said second shift register;

d. a smoothing circuit comprised of digital type logic circuits connected to receive, in parallel, the outputs from predetermined stages of said first, second and third shift registers for producing a lighting control signal indicating that a discrete dot on said display medium should be lighted when the binary signals stored in said read-only memory for said selected character dictate that either the dot group including said discrete dot is to be lighted, or both of the dot groups adjacent to said one discrete dot are to be lighted and the dot group diagonally adjacent to said one discrete dot is not to be lighted; and

e. output selector means connected to the output of said smoothing circuit and to said row selecting means for applying said lighting control signal to said display medium.

## 3,921,165
## HIGH RESOLUTION GRAPHIC DATA TABLET

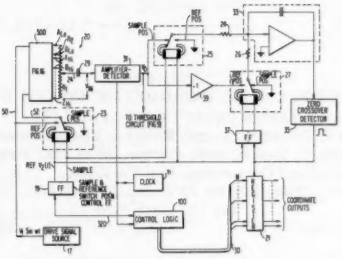
**Herbert Dym, Mahopac, N.Y., assignor to International Business Machines Corporation, Armonk, N.Y.**

**Filed Mar. 21, 1973, Ser. No. 343,577**

*Disclosure was also published under Trial Voluntary Protest Program on Jan. 28, 1975.*

**Int. Cl.[2] H03K** *13/20*

**U.S. Cl. 340—347 NT** **13 Claims**



**10.** A position transducing system comprising:

a. a voltage distribution means having end taps and intermediate taps defining adjacent sectional parts of distribution means for producing, in response to a voltage applied to any pair of said taps, a distributed voltage which varies between said pair of taps as a function of position between said pair of taps,

b. reference voltage producing means,

c. sensor means movable in the vicinity of said voltage distribution means for sensing said distributed voltage most nearly adjacent the instantaneous position of said sensor means,

d. mode control means for providing first and second mode control signals designating first and second mode operation, respectively,

e. means responsive to said first mode control signal for applying said reference voltage between said end taps,

f. section storage means for storing a value therein,

g. means responsive to said first mode control signal and to said sensor means for deriving a value representative of the said section of said voltage distribution means which is most nearly adjacent the instantaneous position of said sensor means and for entering said value into said section storage means, and

h. means responsive to said second mode control signal and to said section storage means for applying said reference voltage between the pair of said taps which define the said section designated by the value stored in said section storage means.

## 3,921,166
## CAPACITANCE MATRIX KEYBOARD

**John W. Volpe, Rockland, Mass., assignor to Raytheon Company, Lexington, Mass.**

**Filed Sept. 15, 1972, Ser. No. 289,523**

*Disclosure was also published under Trial Voluntary Protest Program on Jan. 28, 1975.*

**Int. Cl.[2] H04L** *15/06*

**U.S. Cl. 340—365 C** **12 Claims**

**1.** In combination:

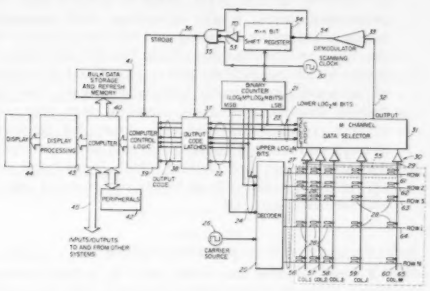
a matrix of capacitive key switches, said matrix having first and second sets of conductors;

means for providing a count;

means for providing a carrier signal;

means for applying said carrier signal to said first set of conductors one at a time in response to said count providing means; and

means for detecting the conductor of said first set of conductors to which said carrier signal is applied and to



which conductor of said second set of conductors and carrier signal is coupled by a selected one of said key switches.

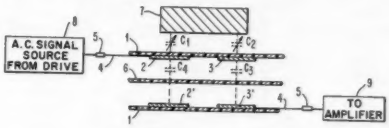
## 3,921,167
## CAPACITIVE CIRCUITBOARD

**Jon Edward Fox, Cary, N.C., assignor to International Business Machines Corporation, Armonk, N.Y.**

**Filed June 14, 1974, Ser. No. 479,683**

**Int. Cl.[2] G08C** *1/00*

**U.S. Cl. 340—365 C** **5 Claims**




**3.** Capacitively couplable circuit apparatus, comprising:

a first, flexible, sheet of dielectric material having a first electrically conductive pattern comprising a plurality of adjacent areas of conductive material, said first pattern being on a first surface of said first sheet of dielectric material;

at least one of said electrically conductive areas of said first pattern having means for connecting it to a source of alternating current voltage and at least one adjacent area of said conductive material being insulated from said alternating current voltage by an intervening area of said dielectric material;

a second sheet of dielectric material having on a first surface thereof, a second pattern of electrically conductive material comprising a plurality of adjacent areas;

at least one of said areas of said second pattern having means for connecting it to an output terminal;

a third, flexible, sheet of dielectric material;

said first, second, and third sheets overlying one another in substantially continuous contact with one another in an order so that said third sheet lies between said first and second sheets, said first and second patterns of conductive material on said first and second sheets, respectively, being in contact with opposite sides of said third sheet;

means for holding said first and second sheets in alignment with one another so that corresponding areas of said conductive material patterns are opposite one another with said at least one area of said first pattern which is insulated from said alternating current source being opposite said at least one electrically conductive area on said second sheet having said means for connecting it to said output terminal; and

a means for conducting electrical current;

said conducting means being placed in proximity to said first sheet in alignment with at least one of said areas

which is connected to said alternating current source of voltage by said connecting means and in alignment with at least one of said areas which is isolated from said alternating current source of voltage, said conducting means substantially overlying said two areas on said first sheet and being on the side of said first flexible dielectric sheet which is opposite the side on which said first pattern of electrically conductive material is placed, said conducting means capacitively coupling said alternating current voltage from said area connected therewith, through said conducting means, to said adjacent conductive area of said first pattern which is insulated from alternating current voltage by said intervening area of said dielectric material.

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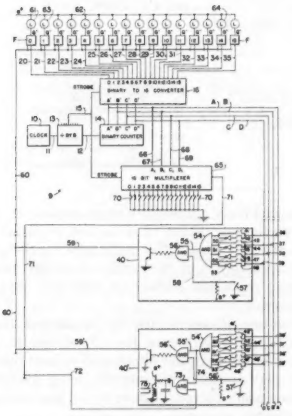
## 3,921,168
## REMOTE SENSING AND CONTROL SYSTEM

**Robert A. Dunbar, Swampscott, Mass., assignor to Damon Corporation, Needham Heights, Mass.**

**Filed Jan. 18, 1974, Ser. No. 434,481**
**Int. Cl.[2] G08B** *25/00;* **H04Q** *9/00*
**U.S. Cl. 340—408** **17 Claims**



**1.** A system for monitoring remote units comprising, in combination,

a. a center having signal wires extending therefrom, means generating a wave signal in each of said signal wires, said wave signals being of increasing wave lengths increasing from one of said wires to the next by a whole multiple greater than one, flip flops, an indicator means activated by each flip flop, a monitoring wire connected to each flip flop and extending from said center, and means counting wave signals and having outputs each connected to one of said flip flops, said outputs each sending a signal to a flip flop during a given count which is during a given time interval; and

b. a plurality of remote monitoring units, each remote unit having a sensing switch, gate means, inverters connected to said gate means, means connected to each of said signal wires and being selectively preset to route signals from each of said signal wires directly to said gate means and alternately through one of said inverters to said gate means, said means connected to each of said signal wires routing signals to said gate means to code each remote unit by causing the gate means of each remote unit to emit a signal during a given time interval, and means connected to said monitoring wire responsive to a position of said remote unit sensing switch passing the signal emitted by said gate means through said monitoring wire; a signal in said monitoring wire and a simultaneous signal from an output of said means counting wave signals activating each of said flip flops to in turn activate one of said indicator means at the center according to a position of each of said remote unit sensing switches.

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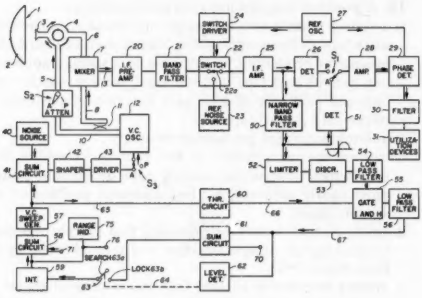
## 3,921,169
## MULTIPLE MODE RADIOMETRIC SYSTEM WITH RANGE DETECTION CAPABILITY

**Robert E. Lazarchik, Largo; Robert S. Roeder, Dunedin, and Donald R. Runkle, Palm Harbor, all of Fla., assignors to Sperry Rand Corporation, New York, N.Y.**

**Filed July 18, 1974, Ser. No. 489,668**
**Int. Cl.[2] G01S** *9/26*
**U.S. Cl. 343—5 R** **10 Claims**



**1.** In a high frequency radiometric system having directive antenna and radiometer receiver means,

voltage controlled high frequency oscillator means,

isolator means for coupling a first portion of the oscillation energy from said voltage controlled high frequency oscillator means for illumination of a target by said directive antenna means,

coupler means for coupling a second portion of the oscillation energy from said voltage controlled high frequency oscillator means to said radiometer receiver means for generating therein a beat frequency signal in the presence of said illuminated target,

radiometer switch means for cyclically and alternately coupling said beat frequency signal or a first reference noise signal to envelope detector means,

phase detector means responsive to said envelope detector means in synchronous relation with the operation of said radiometer switch means,

radiometer utilization means responsive to said phase detector means,

frequency discriminator means responsive to said beat frequency signal for generating a control signal upon departure of said beat frequency from a predetermined frequency value, and

control circuit means responsive to said control signal by readjusting said voltage controlled high frequency oscillator means so that the departure of said beat frequency signal from said predetermined value is corrected.

## 3,921,170

## METHOD AND SYSTEM FOR COMPUTING ALTITUDE OVER A TARGET AND THE HORIZONTAL RANGE THEREOF

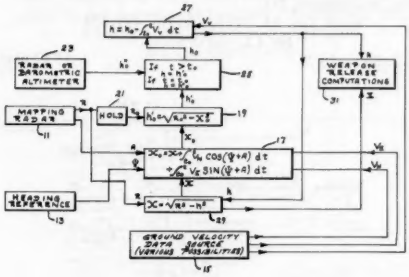
**Donald J. Schmidt, Laurel, Md., assignor to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.**

**Filed July 31, 1972, Ser. No. 278,491**

*Disclosure was also published under Trial Voluntary Protest Program on Jan. 28, 1975.*

**Int. Cl.[2] G01S 9/04**

**U.S. Cl. 343—12 A** **3 Claims**




**1.** A system for computing altitude over a target and horizontal range thereof from an aircraft comprising:

a. a mapping radar having azimuth output A and slant range output R at a present time *t;*

b. a source of heading reference $\psi$;

c. a ground velocity data source having outputs of vertical velocity $V_V$ and north and east components of ground velocity $V_N$ and $V_E$ respectively of the aircraft;

d. a first means for computing the horizontal range $X_o$ at a time of acquisition $t_o$ according to the relationship

$$X_o = X + \int_{t_o}^{t} V_N \cos(\psi + A)\, dt + \int_{t_o}^{t} V_E \sin(\psi + A)\, dt$$

the first horizontal range computing means being fed by the azimuth output A from the mapping radar, the heading reference source, and the ground velocity data source;

e. means for holding the slant range R producing the output $R_o$ at time $t_o$;

f. a first means for computing height $h_o'$ according to the relationship

$$h_o' = \sqrt{R_o^2 - X_o^2}$$

the first height computing means being fed by the holding means and the first horizontal range computing means;

g. an altimeter;

h. means for logical selection of the outputs of the altimeter and the first height computing means the selection depending respectively upon the equality of the present time t and the acquisition time $t_o$ or t being greater than $t_o$;

i. a second means for computing height h according to the relationship

$$h = h_o - \int_{t_o}^{t} V_V\, dt$$

the second height computing means being fed by the ground velocity data source and logical selection means; and

j. a second means for computing the horizontal range X at present time t according to the relationship

$$X = \sqrt{R^2 - h^2}$$

the second horizontal range computing means being fed by the mapping radar and the second height computing means.

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## 3,921,171

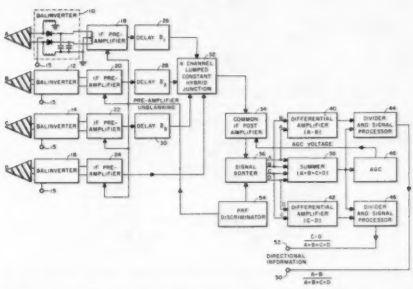
## ULTRA-WIDE BAND MONOPULSE RADAR RECEIVER

**Claude Strother, Jr., Los Gatos, and John R. Clark, Corona, both of Calif., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.**

**Filed May 15, 1964, Ser. No. 368,453**

**Int. Cl.[2] G01S 9/22**

**U.S. Cl. 343—16 M** **6 Claims**




**1.** In a monopulse type radar receiver the combination comprising:

a. a plurality of frequency-insensitive antennas arranged in an amplitude-sensitive array for receiving energy in the microwave region,

b. a multi-channel lumped constant hybrid junction having a plurality of inputs corresponding to the number of said plurality of antennas and having a single output,

c. a plurality of coupling circuits, each having a different time delay, for coupling the signals received at said antennas to the inputs of said hybrid junction,

d. amplifier circuit means for amplifying the output signals from said hybrid junction,

e. signal sorter means for providing a plurality of output signals corresponding to the plurality of signals received at said plurality of antennas,

f. a summing circuit coupled to the output of said signal sorter for producing an output signal proportional to the sum of the output signals,

g. a first differential circuit means coupled to the output of said signal sorter for producing an output signal proportional to the difference of two of the output signals,

h. a second differential circuit means coupled to the output of said signal sorter for producing an output signal proportional to the difference of two other of the output signals,

i. signal processing circuit means coupled to the outputs of said first and second differential circuit means and to the output of said summing circuit for producing a first output signal proportional to the quotient of the output signal from said first differential circuit and the output signal of said summing circuit, and a second output signal proportional to the quotient of the output signal from said second differential circuit and the output signal of said summing circuit.

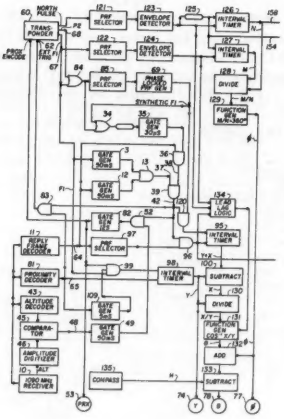
## 3,921,172
## PROXIMITY INDICATION WITH RANGE AND BEARING MEASUREMENTS

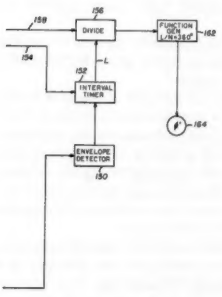
George B. Litchford, Northport, N.Y., assignor to Litchstreet Co., Northport, N.Y.

Continuation-in-part of Ser. No. 371,839, June 20, 1973, Pat. No. 3,858,211, which is a division of Ser. No. 180,578, Sept. 15, 1971, Pat. No. 3,757,324. This application June 21, 1974, Ser. No. 481,902The portion of the term of this patent subsequent to Dec. 31, 1991, has been disclaimed.

Int. Cl.[2] G01S 9/56

U.S. Cl. 343—16 R 6 Claims





1. A method of determining at an own transponder station the bearing angle $\phi'$ of another transponder station from a selected one of a plurality of secondary surveillance radars (SSR) that transmit directional interrogation signals of the same frequency and that omniazimuthally transmit reference signals as the main radar beams thereof sweep through a standardized reference direction, such as magnetic North, said method comprising the steps of:

a. receiving said reference signals from said radars,

b. selecting the reference signals received from one of said secondary surveillance radars,

c. receiving reply signals transmitted by said other transponder station in response to interrogation signals from said selected radar as the main beam thereof sweeps by said other transponder station,

d. measuring the rotational period of the main beam of the selected radar and producing a quantitative first representation of the main beam rotation period,

e. measuring and producing a quantitative second representation of the time interval between reception of one of said selected reference signals and said reply signals and the next subsequently received other one of said signals,

f. dividing the value of the second representation by that of the first representation to produce the quotient of said values, and

g. producing a quantitative representation $\phi'$ of said quotient.

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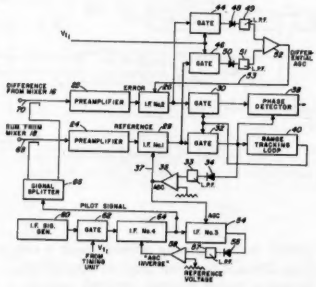
## 3,921,173
## ACCURATE NORMALIZATION FOR A MONOPULSE RADAR

Don N. Thomson, Haddonfield, N.J., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Aug. 14, 1974, Ser. No. 497,434

Int. Cl.[2] G01S 9/22

U.S. Cl. 343—16 M 13 Claims



1. An automatic gain control and normalization system for equalizing the gains of the sum and difference I.F. amplifiers in a monopulse radar system comprising:

first I.F. amplifier means;

second I.F. amplifier means;

means for generating an I.F. difference voltage and an I.F. sum voltage from the R.F. signals from a plurality of antennas in a monopulse radar system and applying the I.F. difference voltage as an input to said first I.F. amplifier means and applying the I.F. sum voltage as an input to said second, I.F. amplifier means;

third I.F. amplifier means;

first A.G.C. means, with its input coupled to the output of said second I.F. amplifier means, for generating a control signal, and applying the control signal to said second I.F. amplifier means and to said third I.F. amplifier means to control their signal levels;

means coupled to said first A.G.C. means for preventing the latter from responding to any signal except an I.F. sum signal;

fourth I.F. amplifier means with its output coupled to the input of said third I.F. amplifier means;

signal generator means for generating an I.F. pilot signal and applying this I.F. pilot signal to said fourth I.F. amplifier means at predetermined intervals chosen so that said pilot signal does not interfere with an I.F. sum or difference voltage;

second A.G.C. means, with its input coupled to the output of said third I.F. amplifier means, for comparing its input signal to a reference, generating a control signal, and applying this control signal to said fourth I.F. amplifier means to control its gain such that it is inversely proportional to the gain of said third I.F. amplifier means;

means for electrically coupling the output signal from said fourth I.F. amplifier means to the inputs of said first and said second I.F. amplifier means;

first gate means with its input coupled to the output of said first, I.F. amplifier means;

second gate means with its input coupled to the output of said second I.F. amplifier means, said first and second gate means being open only during the predetermined times when said I.F. pilot signal is generated by said signal generator means; and

comparing means connected to the outputs from said first and said second gate means for comparing their signal outputs and applying an error signal to said first I.F. amplifier means to control its signal level.

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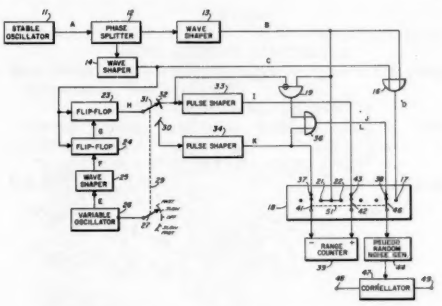
## 3,921,174
## DIGITAL TRACKING RANGE UNIT

**Robert D. Isaak, and Woodrow H. Littrell, both of San Diego, Calif., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.**

**Filed Dec. 20, 1963, Ser. No. 333,267**
**Int. Cl.[2] G01S *11/00***
**U.S. Cl. 343—112 D** **4 Claims**




1. A digital tracking range unit for use with a correlated signal comprising:

stable frequency pulse generating means for generating pulses having a first output of a frequency F and a second output of a frequency **2F**;

variable frequency pulse generator means having variable frequency output pulses lower in frequency than said stable frequency pulse generator;

an inhibit gate having an inhibit input, a signal input, and an output;

digital range counting means having an add input and a subtract input;

signal generating means for generating a signal of a predetermined pattern, said signal generating means having a shift pulse input, and having an output period depending upon a signal present at said shift pulse input;

signal comparator means having first and second inputs and an output, said first input connected to an output of said signal generating means;

a switch connected to an output of said variable frequency pulse generator for switching said output of said variable frequency pulse generator from said inhibit gate inhibit input and said digital range counter add input to said signal generating means shift pulse input and said digital range counter subtract input;

second switching means connected to said signal generating means shift pulse input for switching said shift pulse input from the output of said inhibit gate to said second output of said stable frequency pulse generating means or to an off position;

a third switch mechanically coupled to said second switch for connection said digital range counter add input from said inhibit gate inhibit input to an off position or to said inhibit gate signal input; and

a fourth switch mechanically coupled to said second and third switch for connecting said digital range counter subtract input from said variable frequency pulse generating means output to said inhibit gate signal input or to an off position.

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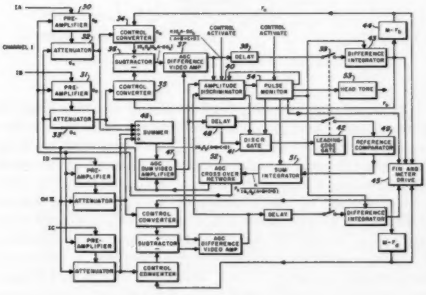
## 3,921,175
## METHOD OF MONOPULSE ANGLE GATING FOR COMPUTER

**Richard S. Hughes, and James L. Phillips, both of Dallas, Tex., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.**

**Filed Feb. 20, 1968, Ser. No. 707,923**
**Int. Cl.[2] G01S *3/16***
**U.S. Cl. 343—119** **1 Claim**



1. A monopulse angle-gated computer for determining the direction of an energy radiating source comprising:

receiver means for generating beam pairs having principle axes located in intersecting orthogonal planes;

a servo-mechanism associated with each of said beam pairs and receiving the output of said receiver means corresponding to a beam pair and producing an error function dependent upon the voltage difference of each individual beam pair,

said servo-mechanism being adapted to determine the angle to said energy radiating source,

a further servo-mechanism coupled to each of said first-mentioned servo-mechanisms for normalizing the source signal strength from the error function of said first-mentioned servo-mechanisms,

summing means included in said further servo-mechanism adapted to receive an input corresponding to each of said individual beams and having an output,

gating means operative to interrupt the flow of information through the first-mentioned servo-mechanisms,

said gating means having a predetermined reference threshold level so that signals at a given level below a reference will not allow operation of the first-mentioned servo-mechanisms,

upper intensity discrimination means adapted to be actuated when the input signal is greater than a given level above the reference,

the upper intensity discrimination corresponds to angle-gating,

said further servo-mechanisms incorporating amplitude discrimination means,

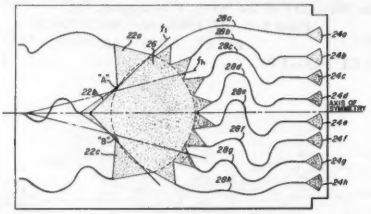
the input to said amplitude discriminating means comprising the difference pulses from the first-mentioned servo-mechanisms and a summation pulse from said last mentioned servo-mechanisms, and

said amplitude discriminator operating to compare each difference pulse with the summation pulse.

## 3,921,176
## CONSTANT BEAMWIDTH ANTENNA

**Robert E. Shanafelt; Richard F. Hilton, both of Goleta, and Donald H. Archer, Santa Barbara, all of Calif., assignors to Raytheon Company, Lexington, Mass.**

**Filed Feb. 15, 1974, Ser. No. 442,703**
**Int. Cl.[2] H01Q** *19/06*
**U.S. Cl. 343—754** **2 Claims**

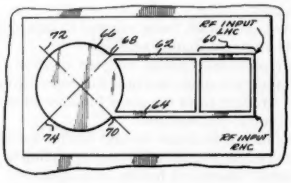


**2.** In an antenna assembly for providing a directive beam of electromagnetic energy, such beam being formed by interference between electromagnetic energy radiated from an array of antenna elements energized, through constrained electrical paths including a printed circuit lens having an irregular geometrical shape, by electromagnetic energy from a source thereof, such source being adapted to produce electromagnetic energy at any frequency within a band of frequencies, the improvement comprising: Means coupling a source of electromagnetic energy to said lens, such means including a feedport having a width equal to the wavelength, at the center of a band of operating frequencies, of the electromagnetic energy out of such source.

## 3,921,177
## MICROSTRIP ANTENNA STRUCTURES AND ARRAYS

**Robert E. Munson, Boulder, Colo., assignor to Ball Brothers Research Corporation, Boulder, Colo.**

**Filed Apr. 17, 1973, Ser. No. 352,005**
**Int. Cl.[2] H01Q** *1/38, 3/26*
**U.S. Cl. 343—846** **12 Claims**

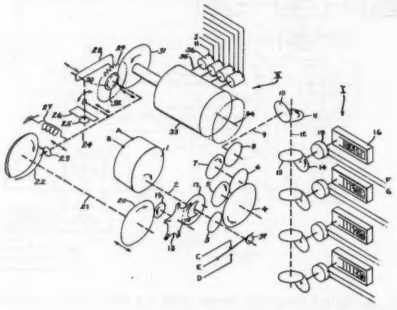



**1.** An antenna structure comprising:
an electrically conducting ground surface,
a single layer electrically conducting surface comprising both an r.f. radiator conducting area and an r.f. feedline conducting area integrally connected thereto,
a dielectric sheet disposed between said ground surface and the single layer electrically conducting surface, and
said r.f. feedline being connected at the outside edge of said r.f. radiator conducting area to at least one predetermined point on the periphery of said radiator conducting area to achieve an r.f. radiation pattern having predetermined polarization characteristics from said radiator,
said r.f. feedline conducting area including:
a first section connected to only a first point on the outside edge of said r.f. radiator conducting area,
a second section connected to only a second point on the outside edge of said r.f. radiator conducting area,
said first and second points being separated by a predetermined amount along the outside edge of said r.f. conducting area to define two intersecting axes of current flow, each such axis passing through a corresponding one of said first and second points, and
phase shifting means connected between said first and second sections and a common r.f. input/output point whereby the relative phases of r.f. signals on said first and second sections are controlled with respect to the phase at said common r.f. input/output to produce an r.f. radiation pattern having circular polarization characteristics.

## 3,921,178
## TIME UTILIZATION MONITOR

**Charles F. Weisgerber, P.O. Box 1489, Wickenburg, Ariz. 85358**

**Filed Feb. 11, 1974, Ser. No. 441,014**
**Int. Cl.[2] G01D** *9/30*
**U.S. Cl. 346—14** **17 Claims**



**1.** A time utilization monitor including; a continuously operating timer motor drive, an intermittent motion means operated by the drive and having a dwell period and a motivating period, a laterally shiftable and longitudinally advancive record member, oscillating means responsive to the intermittent motion means during said motivating period and laterally reciprocating said record member, advance means responsive to said reciprocation and incrementally advancing said record member longitudinally, at least one initer means responsive to a condition sensor and activated thereby to mark the said record member during said lateral reciprocation thereof.

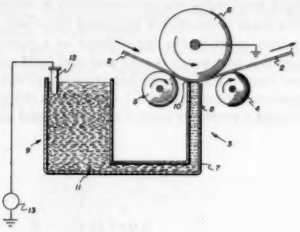
## 3,921,179
## FLUID PEN ASSEMBLY

**Ronald J. Weerstra, Clare, Mich., assignor to Xerox Corporation, Stamford, Conn.**

**Filed Apr. 16, 1973, Ser. No. 351,222**
*Disclosure was also published under Trial Voluntary Protest Program on Jan. 28, 1975.*
**Int. Cl.[2] G03G** *15/00*
**U.S. Cl. 346—74 ES** **10 Claims**

**6.** Recording apparatus comprising
a recording medium,
a container having an opening therein adjacent one side of said medium,
an electrically conductive fluid in said container forming a convex menisucs at one end thereof extending beyond said opening and contacting said one side of said medium, means for moving said medium in contact with said meniscus, said fluid being non-wettable to said medium,
a source emitting electrical signals in accordance with information to be recorded, and

means for connecting said source across said fluid and said recording medium whereby an electrical charge is deposited on said recording medium in accordance with said electrical signals.



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## 3,921,180
## DEVICE FOR DIRECT ELECTROSTATIC RECORDING USING A SPRAY ELECTRODE

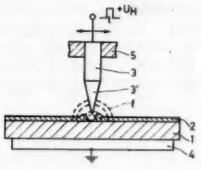
**Hans-Dieter Hinz, Tornesch, Germany, assignor to U.S. Philips Corporation, New York, N.Y.**

**Filed May 28, 1974, Ser. No. 473,772**

**Claims priority, application Germany, June 9, 1973, 2329595**

**Int. Cl.² G11B 11/02; G03G 15/00**

**U.S. Cl. 346—74 ES** **2 Claims**



**1.** A device for direct electrostatic recording of the type using conductive toner material uniformly deposited on an electrically insulating record carrier, the improvement comprising a pointed spray electrode means facing said toner material and in very close proximity thereto for attracting the toner material only directly underneath the tip of the spray electrode means and for subsequently depositing the attracted toner material adjacent the location on the record carrier from which the toner material has been removed in response to an electrical voltage, and means for applying to said electrode an electrical voltage modulated by information to be recorded.

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## 3,921,181
## COMPLIANT PRINTER BLADE FOR FACSIMILE PRINTER

**Frank W. Hauser, Santa Monica, Calif., assignor to Telautograph Corporation, Los Angeles, Calif.**

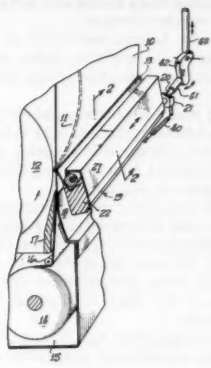
**Filed Mar. 11, 1974, Ser. No. 449,738**

**Int. Cl.² G03G 17/02; G01D 15/06**

**U.S. Cl. 346—73 E** **2 Claims**

**1.** An improved printing blade apparatus for use in a facsimile printer having a rotating drum with a helical conducting wire on the surface thereof for printing on an electrolytic web that moves over said drum in a direction perpendicular to the axis of rotation of said drum, said web passing between a blade parallel to said axis and said drum, said apparatus comprising a thin planar strip of metal held along one longitudinal end in a position to serve as said blade with an edge opposite said one end against said web, and

a rigid carriage means for holding said thin planar strip of metal along said one end with said opposite edge against said web and with said planar strip inclined at an acute angle with said web, said angle being selected for said opposite edge to point in the direction of motion of said web wherein said carriage means includes biasing means



for adjusting the position of said thin planar strip against said web with a desired pressing force of said strip against said web to maintain said strip against said web as said drum rotates, whereby localized compliance of said strip is provided to allow for deviations in the diameter of said wire and distance of said wire from said drum axis, and for variations in the thickness of said web.

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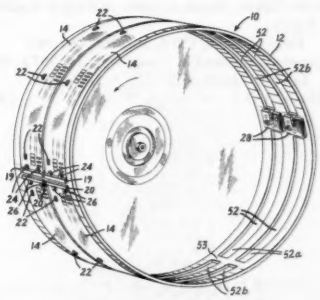
## 3,921,182
## FONT STRIP AND RETAINING MECHANISM FOR A PHOTOCOMPOSING MACHINE

**Walter Hansen, Cold Spring Harbor; Joel S. Harris, Malverne, and Herbert Klepper, Brooklyn, all of N.Y., assignors to Eltra Corporation, New York, N.Y.**

**Filed Aug. 22, 1974, Ser. No. 499,562**

**Int. Cl.² G03B 17/06**

**U.S. Cl. 354—15** **10 Claims**



**1.** A photocomposing machine comprising, in combination:
a. a rotatable character drum for presenting typographical characters in succession to an optical system for imaging onto a sensitized medium, said drum including a cylindrical member and means for guiding and removably retaining, on said cylindrical member at least one character carrier on which is arranged at least one font of said typographical characters, said guiding means including a plurality of guide pins disposed around and protruding from the periphery of said cylindrical member, and said retaining means comprising:

1. at least one stationary retaining pin rigidly attached to and protruding from the peripheral surface of said cylindrical member;
2. at least one movable retaining pin; and
3. pin mounting means for supporting said movable retaining pin on said cylindrical member, comprising:
   i. a supporting block having said movable retaining pin rigidly attached thereto;
   ii. means for holding said block to said cylindrical member while permitting sliding movement in the circumferential direction of said cylindrical member; and
   iii. spring means for biasing said block tangentially to the peripheral surface of said cylindrical member, such that said movable retaining pin is urged in a circumferential direction away from the position of said stationary pin; and

b. at least one character carrier comprising:
1. a flexible band of material having disposed thereon two longitudinal successions of elements aligned in laterally displaced relation, the elements of one longitudinal succession being typographical characters and the elements of the other longitudinal succession being timing marks,
said two longitudinal successions of elements being arranged substantially adjacent to each other along one side of said band of material and having an optical transmissivity opposite to that of the remaining portion of said band of material,
said band of material having a plurality of guide apertures, located adjacent and along said other side thereof, for receiving said guide pins of said character drum, and
said band of material having at least one retaining aperture, located at each end thereof, for receiving said stationary and said movable retaining pins, respectively; and
2. at least one rigid supporting strip adjacent said retaining aperture to prevent said band of material from turning.

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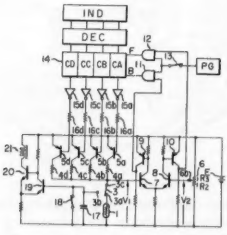
## 3,921,183
## AUTOMATIC EXPOSURE CONTROL SYSTEMS AND LIGHT METERING SYSTEMS FOR CAMERAS

**Kenji Toyoda, Tokyo, Japan, assignor to Nippon Kogaku K.K., Tokyo, Japan**

**Filed Apr. 16, 1974, Ser. No. 461,383**
**Claims priority, application Japan, Apr. 25, 1973, 48-46117**
**Int. Cl.[2] G03B** *7/08, 17/18;* **G01J** *1/44*
**U.S. Cl. 354—23 D** **22 Claims**




1. An automatic exposure control system for a camera, the system comprising:
counter means;
variable resistance means having a resistance which varies in accordance with the count in said counter means;
light responsive means;
means for passing a current proportional to the intensity of light incident on said light responsive means through a circuit including said variable resistance means and said light responsive means connected in series;
count control means for adjusting the count in said counter means to maintain the voltage at a point at which said variable resistance means and said light responsive means are connected at a predetermined voltage level; and
exposure control means for controlling the exposure of film in said camera in accordance with said count.

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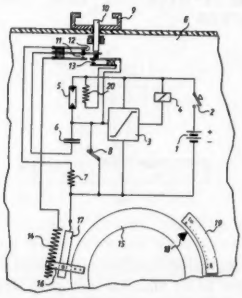
## 3,921,184
## COMPENSATION OF RESPONSE SLUGGISHNESS OF PHOTOELEMENTS EMPLOYED IN AUTOMATIC EXPOSURE TIMERS

**Kurt Borowski; Friedrich Stumpf, both of Munich, and Eduard Wagensonner, Aschheim, all of Germany, assignors to Agfa-Gevaert AG, Leverkusen, Germany**

**Filed May 8, 1974, Ser. No. 468,134**
**Claims priority, application Germany, May 10, 1973, 2323557**
**Int. Cl.[2] G03B** *7/08, 7/16*
**U.S. Cl. 354—32** **6 Claims**

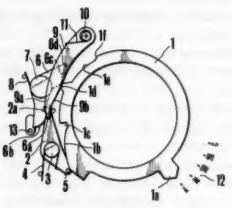


1. In a photographic camera of the type adapted for making exposures with and also without a photoflash unit, in combination, photosensitive means operative for detecting scene brightness but exhibiting a time delay in the detection of a sudden scene brightness increase such as occurs when a photoflash unit produces a flash; exposure-type selecting means having a first setting for photoflash exposures and a second setting for other exposures; an automatic exposure timing arrangement operative for automatically selecting the time duration of an exposure in dependence upon the scene brightness detected by said photosensitive means during the making of the exposure, both when said exposure-type selecting means is in said first setting and when said exposure-type selecting means is in said second setting; and compensating means operative for counteracting the effect of said time delay upon the operation of said timing arrangement in order to counteract any tendency of said timing arrangement to select too long an exposure time when the camera makes a photoflash exposure, said compensating means comprising exposure-shortening means operative for causing said timing arrangement to automatically select shorter scene-brightness-dependent exposure times when said exposure-type selecting means is in said first setting than when said exposure-type selecting means is in said second setting.

## 3,921,185
## DIAPHRAGM ADJUSTMENT MODE SELECTING DEVICE FOR A PHOTOGRAPHIC CAMERA

**Mutsunobu Yazaki, Yokohama, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan**

**Filed June 12, 1974, Ser. No. 478,750**
**Claims priority, application Japan, June 19, 1973, 48-68925**
**Int. Cl.² G03B 9/02**
**U.S. Cl. 354—40** **3 Claims**



**1.** In a camera for operation in daylight and artificial light, an automatic exposure control apparatus for controlling the effective exposure aperture in automatic response to the level of illuminance of a subject being photographed as sensed photoelectrically comprising:

diaphragm means arranged to provide a range of effective exposure apertures;

a diaphragm adjustment mode selector member movable between a plurality of positions, one position being indicative of automatic selection of effective exposure apertures for daylight photography, one position being indicative of a particular effective exposure aperture for special flash photography, and the remaining positions being indicative of different guide numbers for flash-auto photography;

guide number factoring means arranged to engage said selector member upon movement of said selector member between said positions thereof to assume the corresponding positions;

focus adjusting means including output means arranged to operatively engage said guide number factoring means at least when said selecting member is set to one of the flash-auto photography positions; and

automatically adjustable setting means for said diaphragm means being arranged to permit the diaphragm means to operate throughout the entire dynamic range thereof when said selector member is set in the daylight photography position, to select an effective exposure aperture as a function of the positions of said guide number factoring means and said output means when said selector member is set in one of the flash-auto photography positions, and to select the particular effective exposure aperture when said selector member is set in the special flash photography position.

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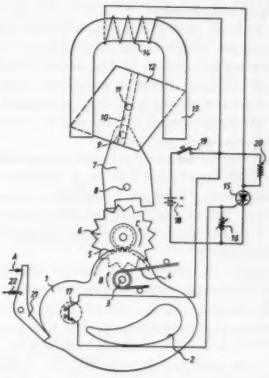
## 3,921,186
## PHOTOGRAPHIC CAMERA WITH SIMPLIFIED DIAPHRAGM OPENING MECHANISM

**Peter Lermann, Narring, Germany, assignor to AGFA-Gevaert AG, Leverkusen, Germany**

**Filed June 12, 1974, Ser. No. 478,821**
**Claims priority, application Germany, June 22, 1973, 2331857**
**Int. Cl.² G03B 7/08, 9/02**
**U.S. Cl. 354—43** **5 Claims**

**1.** In a photographic camera having a diaphragm and photoelectric circuit means responsive to light passing through said diaphragm for furnishing a stop signal when said light is a predetermined light quantity, the improvement, comprising, in combination, opening means coupled to said diaphragm for opening said diaphragm; a retard mechanism for opposing the motion of said diaphragm during the opening thereof; and an electromagnet energized in response to said stop signal and having an armature mechanically coupled to said retard mechanism to form a part thereof in such a manner that the motion of said retard mechanism is stopped upon stopping of the



motion of said armature, said armature being mounted relative to said electromagnet in such a manner that energization of said electromagnet stops said motion of said armature and thereby of said retard mechanism, whereby said opening of said diaphragm is stopped when the light passing through said diaphragm is said predetermined light quantity.

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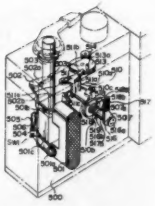
## 3,921,187
## PHOTOGRAPHIC CAMERA HAVING ELECTRIC SHUTTER

**Toshio Kobori, Sakai, and Toru Matsui, Osaka, both of Japan, assignors to Minolta Camera Kabushiki Kaisha, Osaka, Japan**

**Filed June 28, 1974, Ser. No. 484,372**
**Claims priority, application Japan, July 2, 1973, 48-73616; July 9, 1973, 48-76541; July 9, 1973, 48-76542**
**Int. Cl.² G03B 17/40**
**U.S. Cl. 354—50** **11 Claims**



**10.** A photographic camera having an electric shutter, an electric power source and an electric control circuit including a light measuring circuit connectable to said electric power source said camera comprising:

a shutter release member having an inoperative position from which it is moved for actuation of said electric shutter;

a locking member for locking said release member in said inoperative position, thereby restraining operation of said shutter;

a normally open electric power source switch adapted to open or close the connection of said electric power source with at least said light measuring circuit;

a first actuating member moveable between a first rest position and a second operating position for closing said electric power source switch, said actuating member being mounted at the side of the photographic camera and positioned to be engaged and moved to said second position by the hands of the user holding said camera for manual photographing;

means for moving said locking member for releasing said shutter release member from its locked position, when said actuating member is in said second position;

a self-timer cocking member moveable from a clocked position to a rest position during a designated time lapse interval after movement of said shutter release member from its inoperative position;

a second actuating member provided separately from said first actuating member and having a first rest position and a second operating position in which it is adapted to close said electric power source switch and release the shutter release member from its locking engagement by said locking member;

a drive member for driving said second actuating member from its first rest position to its second operating position; means for moving said second actuating member from its second operating position to its first rest position against the action of said drive member in association with termination of the exposure by said electric shutter;

an arresting member biased to remain in an arrested position in engagement with said second actuating member when said second actuating member is in its first rest position, and moveable to a releasing position out of engagement with said second actuating member; and

means for driving said arresting member to its releasing position in association with the movement of said cocking member from its rest position to its cocked position.

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**3,921,188**

## SWITCHING DEVICES FOR USE IN PHOTOGRAPHIC CAMERAS

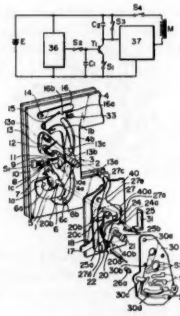
**Toshinori Imura, and Akira Yamanaka, both of Sakai, Japan, assignors to Minolta Camera Kabushiki Kaisha, Osaka, Japan**

**Filed Sept. 25, 1973, Ser. No. 400,644**

**Claims priority, application Japan, Sept. 26, 1972, 47-111015[U]**

**Int. Cl.[2] G03B 9/62**

**U.S. Cl. 354—51** **9 Claims**



1. In a camera, a switch device in an electric shutter control circuit for controlling an exposure in response to shutter release operation, the electric shutter control circuit having a light measuring circuit, a storing circuit for retaining the output of the light measuring circuit, a timing circuit with a timing capacitor responsive to the storing circuit, and a power source, a shutter mechanism having an electromagnetic control member, said switch device comprising:

a first member movable in response to shutter release operation;

a second member movable in response to the movement of said first member;

a switch actuating member movable between a cocked position and a rest position and driven from said cocked position to said rest position in response to the movement of said second member;

an insulating base plate mounted adjacent said switch actuating member;

a discharge switch enabling charging or discharging of said timing capacitor and including a first electrode formed on said insulating base plate and a first contact formed on said switch actuating member to be slidable on said first electrode;

a storage switch for connecting or disconnecting said light measuring circuit with said storing circuit and including a second electrode formed on said insulating base plate and a second contact formed on said switch actuating member to be slidable on said second electrode;

an electromagnet switch for connecting or disconnecting said electromagnetic control member with said power source and including a third electrode formed on said insulating base plate, said second contact being slidable on said third electrode;

whereby with said switch actuating member in said cocked position said first contact is in contact with said first electrode, said second contact is in contact with said second electrode thereby connecting said light measuring circuit with said storing circuit, and concurrently therewith said electromagnet switch disconnects said electromagnetic control member and said power source, and with said switch actuating member in said rest position said second contact is parted from said second electrode to disconnect said light measuring circuit with said storing circuit and concurrently therewith said second contact comes into contact with said third electrode to connect said electromagnetic control member with said power source.

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**3,921,189**

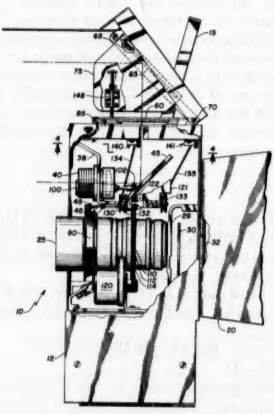
## ZOOM LENS VIEW FINDER SYSTEMS

**Albert F. Gallistel, 2933 Casco Point Road, Wayzata, Minn. 55391**

**Filed Oct. 11, 1974, Ser. No. 514,112**

**Int. Cl.[2] G03B 13/08, 13/12**

**U.S. Cl. 354—220** **16 Claims**



1. A camera with a view finder for remote viewing comprising, a camera including an adjustable lens with a shutter and film pack positioned within a camera housing and with the

adjustable lens projecting through the front wall thereof, a view finder lens positioned through the front wall of the camera and focused on a first tiltable mirror positioned within the housing, a Fresnel lens positioned on the top of the camera and aligned with the tiltable mirror, a foldable housing including a second tiltable mirror positioned adjacent the Fresnel lens on the top of the camera and permitting viewing of the image seen by the adjustable lens of the camera from a position remote from the camera; and means coupling the tiltable mirror within the housing to the adjustable lens to adjust for parallax error between the camera lens and the view finder lens.

**11.** The camera with a view finder for remote viewing of claim **8** and including an adjustment knob coupled to the zoom lens to operate the zoom lens manually from the front of the camera independent of the motor and adjust the size of the image size through adjustment of the image change means.

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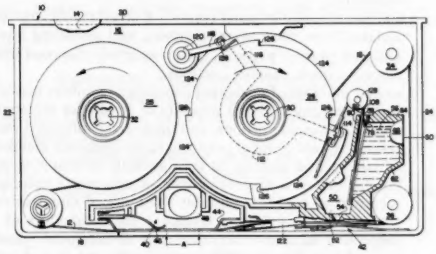
**3,921,190**

## PHOTOGRAPHIC PROCESSING FLUID APPLICATOR

**Robert J. Ell, Malden, Mass., and Frank W. Knight, Jr., Salen, N.H., assignors to Polaroid Corporation, Cambridge, Mass.**

**Filed Jan. 14, 1974, Ser. No. 433,216**
**Int. Cl. G03d** *5/00*
**U.S. Cl. 354—317** **12 Claims**



**1.** An applicator for treating a strip of photographic film material, comprising:

applicator means for applying a processing fluid to the strip of film;

a container for such fluid, operatively connected to said applicator means, comprising a hollow receptacle provided in one of its surfaces with an opening;

web means comprising a strip of flexible material having first and second sections, the first section being releasably attached to said one surface to seal said opening and having an aperture positioned near one end of said first section in an area thereof overlying said opening, the second section being folded over said first section at the other end; and

vent means comprising a strip of flexible material releasably attached at one end to said first section to seal said aperture therein and attached at its other end to said second section;

the arrangement being such that a pulling force exerted on the free end of said second section causes said first section to be peeled off said surface and said one end of said vent means to be removed from said aperture.

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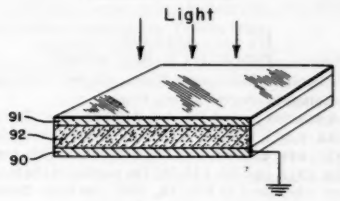
**3,921,191**

## PHOTORESPONSIVE JUNCTION DEVICE HAVING AN ACTIVE LAYER OF ALTERED CONDUCTIVITY GLASS

**Seymour Merrin, Fairfield, Conn., assignor to Innotech Corporation, Norwalk, Conn.**

**Division of Ser. No. 227,932, Feb. 22, 1972, and a continuation-in-part of Ser. No. 122,422, March 9, 1971. This application Nov. 22, 1974, Ser. No. 526,165**
**Int. Cl.² H01L** *45/00*
**U.S. Cl. 357—2** **6 Claims**




**1.** A photoresponsive junction device for sensing light of a given intensity comprising:

a semiconductor substrate having one type of conductivity; disposed upon said semiconductor substrate a layer of an insulating ion impermeable glass having the other kind of conductivity from that of said substrate and containing a sufficient concentration of ionic impurities to possess useful conductivity;

said device possessing a reverse bias breakdown voltage which is dependent upon the presence or absence of light; and

means for applying across the junction between said layer and said substrate a bias voltage of a value between the dark breakdown voltage and the breakdown voltage in the presence of light of said given intensity.

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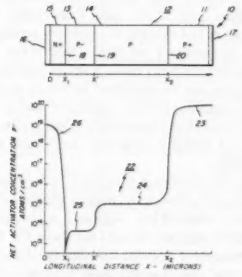
**3,921,192**

## AVALANCHE DIODE

**Herbert Goronkin, Dewitt; Wirojana Tantraporn, and Se Puan Yu, both of Schenectady, all of N.Y., assignors to General Electric Company, Schenectady, N.Y.**

**Filed May 28, 1974, Ser. No. 473,565**
**Int. Cl.² H01L** *29/88, 29/90;* **H03F** *1/36*
**U.S. Cl. 357—13** **8 Claims**




**1.** An avalanche diode comprising

a body of semiconductor material including an active region of a first conductivity type having a first zone and a second zone, each having a pair of opposed faces with adjacent faces being contiguous,

said first zone having an average net activator concentration substantially lower than the average net activator concentration of said second zone.

a first longitudinal distance between opposed faces of said first zone being smaller than a second longitudinal distance between opposed faces of said second zone,

the integral net activator concentration per square centimeter of cross section over the length of said active region being less than $4 \times 10^{11}$ per $cm^2$, contact to the remote face of said first zone,

means for making non-rectifying contact to the remote face of said second zone.

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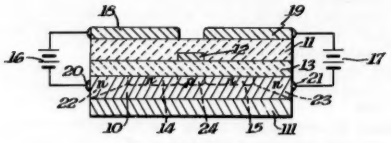
## 3,921,193
## INDUCED CHARGE DEVICE

**Kurt Lehovec, Williamstown, Mass., assignor to Sprague Electric Company, North Adams, Mass.**

**Continuation-in-part of Ser. No. 749,651, Aug. 2, 1968, Pat. No. 3,564,355, which is a continuation-in-part of Ser. No. 703,958, Feb. 8, 1968, Pat. No. 3,473,032. This application Feb. 16, 1971, Ser. No. 115,365The portion of the term of this patent subsequent to Feb. 16, 1988, has been disclaimed.**

**Int. Cl.² H01L** *29/78*

**U.S. Cl. 357—23** **1 Claim**




**1.** i. In a semiconductive body containing a first, second and third chemically doped zone, said first and third zones of a first conductivity type, and said second zone of the opposite conductivity type, said first and third zones spaced from each other along a surface of said body, a plurality of electrical contacts formed on said first, second and third zones;

ii. a set of at least three electrical contacts in close proximity to said surface, said electrical contacts insulated from each other and from said underlying semiconductive body, said set of electrical contacts arranged so that their normal projections on said underlying surface of said semiconductive body form a set of contiguous regions, so that regions are sandwiched between preceding and succeeding regions, the first region of said set being contiguous with said first chemically doped zone, the last region of said set being contiguous with said third chemically doped zone;

iii. means for applying electrical potentials to said electrodes of said set so as to induce electrical charges in their respective underlying regions, wherein at least three consecutive regions of said set have the first and third of said consecutive regions consisting of the first conductivity type and said intermediate second consecutive region consisting of the opposite conductivity type, whereby induced charges of said first conductivity type emitted from said first consecutive region through said second consecutive region of opposite conductivity type into said third consecutive region of said first conductivity type and are collected in said third region to provide lateral current flow from said first chemically doped zone to said third chemically doped zone along said induced charge regions.

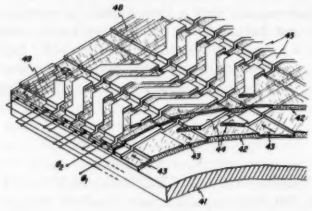
## 3,921,194
## METHOD AND APPARATUS FOR STORING AND TRANSFERRING INFORMATION

**William E. Engeler, Scotia, and Jerome J. Tiemann, Schenectady, both of N.Y., assignors to General Electric Company, Schenectady, N.Y.**

**Continuation of Ser. No. 56,353, July 20, 1970, abandoned. This application July 13, 1973, Ser. No. 378,819**

**Int. Cl.² H01L** *27/10, 29/78*

**U.S. Cl. 357—24** **11 Claims**




**1.** Semiconductor apparatus comprising

a substrate of substantially one conductivity type semiconductor material including a plurality of generally parallel channel portions adjacent a major surface thereof,

an insulating layer overlying said major surface of said substrate,

a first plurality of elongated conductor members electrically isolated from each other, overlying said insulating layer and said channel portions, and transversely disposed with respect to said channel portions,

a second plurality of elongated conductor members insulatingly overlying said first plurality of conductor members and said channel portions, and transversely disposed with respect to said channel portions, each conductor member of said second plurality at least partially overlapping the conductors of a respective pair of adjacent conductor members of said first plurality over one of said channel portions and partially overlapping the conductors of a respective successive adjacent pair of conductor members of said first plurality over an adjacent one of said channel portions, successive pairs of said first plurality including a common conductor member,

means for establishing adjoining depletion regions in each of said channel portions beneath said first plurality of conductor members and said second plurality of conductor members for the storage and transfer of charge along said channel portions.

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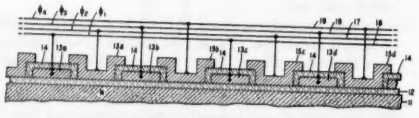
## 3,921,195
## TWO AND FOUR PHASE CHARGE COUPLED DEVICES

**George Elwood Smith, Murray Hill, and Robert Joseph Strain, Plainfield, both of N.J., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.**

**Continuation of Ser. No. 85,026, Oct. 29, 1970, abandoned. This application Apr. 8, 1974, Ser. No. 458,507**

**Int. Cl.² H01L** *27/10, 29/78*

**U.S. Cl. 357—24** **15 Claims**



**1.** In charge coupled apparatus of the type including

a storage medium in which mobile charge can be coupled to potential wells for storage and manipulation;

a first insulating coating disposed over and contiguous with at least a portion of one surface of the medium,

charge transfer means including an electrode assembly disposed entirely over the surface of the first coating such that the electrodes of the transfer means are not in direct contact with the surface of the storage medium,

the improvement being that the electrode assembly comprises a plurality of pairs of electrodes disposed successively laterally over and defining a path above the surface and that;

each of said pairs includes:

a first electrode, the electrode consisting essentially of polysilicon;

a second insulating coating disposed over substantially all of the first electrode of each pair, the insulating coating consisting essentially of genetic silicon dioxide; and

a second electrode disposed between and spaced from and partially overlying the first electrode of said pair and the first electrode of the next adjacent pair, with the portion disposed between the first electrode of said pair and the first electrode of the next adjacent pair separated from the medium by a distance less than the combined thickness of the first and second insulating coatings

the electrodes of the electrode assembly being disposed in relation to each other and in relation to the storage medium such that dynamic storage and sequential transfer of mobile charge carriers coupled to induced potential wells in the storage medium along and underneath the electrode assembly is enabled in response to application of voltages of sufficient magnitude to the electrodes.

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**3,921,196**

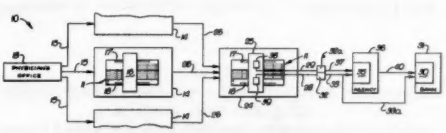
## ENCODING AND PROCESSING OF DRUG PRESCRIPTION FORMS

**Richard J. Patterson, 2170 Century Park East. Apt. 1210, Los Angeles, Calif. 90067**

**Filed Mar. 20, 1972, Ser. No. 236,125**

**Int. Cl. G06f** *3/00*

**U.S. Cl. 235—61.11 D** **6 Claims**



**1.** In a system for processing physician completed medical prescription forms, the combination comprising

a. a prescription form having encoded on one edge portion thereof at a first station primary indicia representing a drug listed by the physician on the prescription, and on another edge portion thereof secondary indicia representing the identity of a selected pharmacy, and a price associated with the drug as supplied by that pharmacy, said primary indicia extending only in a linear sequence parallel to and everywhere adjacent one edge of the form and said secondary indicia extending only in a linear sequence parallel to and everywhere adjacent another edge of the form, and parallel to said primary indicia, the form having main extent between said indicia sequences and which contains columns and rows of blanks to receive physician entered prescription data, the width of said main extent between said indicia sequences being at least several times greater than the maximum width of each of said sequences,

b. scanning means for scanning said edge portions thereby deriving, from said indicia, and at a prescription scanning station, one group of electronic data corresponding to said drug, and another group of electronic data corresponding to pharmacy identity, and drug price, the prescription received at said scanning station, and

c. other means operatively connected with the scanning means for responding to the price and pharmacy identity electronic data only, for electrical transmission to a third station to register financial credit applicable to the selected pharmacy.

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**3,921,197**

## DIRECT CURRENT POWER CONVERTER

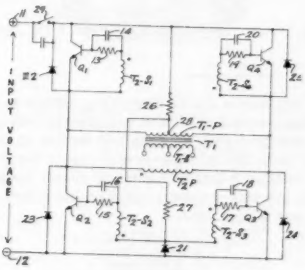
**Sandor J. Horvath, 4556 D St., Philadelphia, Pa. 19120, assignor to Eltra Corporation, Toledo, Ohio**

**Filed Nov. 27, 1973, Ser. No. 419,327**

*Disclosure was also published under Trial Voluntary Protest Program on Jan. 28, 1975.*

**Int. Cl.² H02M** *3/315*

**U.S. Cl. 321—18** **3 Claims**




**1.** A voltage converter for operating from a DC power supply having a regulated DC output voltage of a value different from the supply voltage, comprising, in combination, a power transformer having primary and secondary windings, oscillator means for connecting said primary winding to said power supply, said oscillator means including a full wave transistor bridge connecting said primary winding alternately in opposite polarity to said power supply for inducing an alternating current at a different voltage in said secondary winding and a saturable reactor having a primary winding connected in parallel with said power transformer primary winding and having a plurality of secondary windings connected to control conduction of current control transistors in said transistor bridge, means for rectifying said induced secondary current and applying the rectified voltage across a pair of load terminals, and regulator means for monitoring the voltage across said load terminals for deactivating said oscillator means when such voltage exceeds a predetermined maximum value and for activating said oscillator means when such voltage drops below a predetermined minimum value, said regulator means including voltage responsive electronic switch means having an input connected across said load terminals and an output operably connected to a means effective to disable said oscillator means, such that variations in such load terminal voltage above or below said predetermined maximum or minimum values will cause said switch means to change from one state to another to deactivate and activate said oscillator means.

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**3,921,198**

## THERMOSTATIC TWO-POLE SWITCH

**Walter Pohl, Naples, Italy, assignor to Texas Instruments Incorporated, Dallas, Tex.**

**Filed Oct. 25, 1974, Ser. No. 518,008**

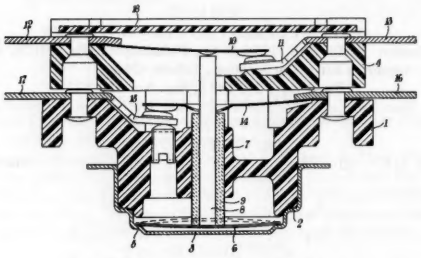
**Claims priority, application Italy, Nov. 12, 1973, 36089/73**

**Int. Cl.² H01H** *37/52*

**U.S. Cl. 337—337** **4 Claims**

**1.** A bipolar thermostatic switch comprising a housing, a thermally responsive, snap-acting bimetallic, dished element

adapted to reverse its dished configuration at a predetermined temperature mounted in said housing, a pair of stationary contact means mounted on said housing, a pair of movable contact means mounted on said housing for movement between control positions engaging and disengaging the said respective stationary contact means, and a pair of control



elements disposed in coaxial telescoping relation to each other each having one end thereof in engagement with said dished element and having an opposite end thereof in engagement with said respective movable contact means for moving said movable contact means between said circuit positions in response to reversing of the curvature of said dished element at said selected temperature.

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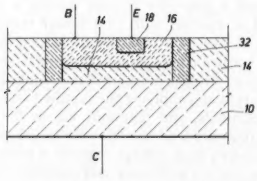
**3,921,199**

**JUNCTION BREAKDOWN VOLTAGE BY MEANS OF ION IMPLANTED COMPENSATION GUARD RING**

**Han-Tzong Yuan, and David Willis Mueller, both of Dallas, Tex., assignors to Texas Instruments Incorporated, Dallas, Tex.**

**Filed July 31, 1973, Ser. No. 384,340**
**Int. Cl.² H01L** *29/36*
**U.S. Cl. 357—58** **10 Claims**



**6.** A planar semiconductor device having an actual breakdown voltage characteristic substantially equal to bulk breakdown voltage, comprising:

a host crystal substrate having an epitaxial layer thereover of the same type majority carriers as said host crystal substrate;

a diffused region in said epitaxial layer of opposite type majority carriers from said epitaxial layer, said diffused region having a depth less than the thickness of said epitaxial layer so as to define a space between said diffused region and said host crystal substrate; and

a guard ring provided in said epitaxial layer and extending from the upper surface thereof in surrounding relation to said diffused region to a depth at least below said diffused region, said guard ring including at least a zone of substantially neutrality in majority carriers in the area immediately adjacent the lowermost portion of said diffused region so as to establish a higher resistivity path from the lower peripheral edge of said diffused region to said host crystal substrate than the resistivity path in said epitaxial layer between an intermediate portion of said diffused region and said host crystal substrate.

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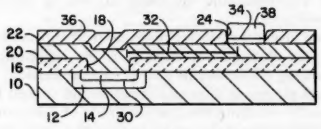
**3,921,200**

**COMPOSITE BEAM LEAD METALLIZATION**

**Hans J. Pille, Mesa, Ariz., assignor to Motorola, Inc., Chicago, Ill.**

**Filed Apr. 15, 1974, Ser. No. 461,079**
**Int. Cl.² H01L** *23/48, 29/46, 29/62, 29/64*
**U.S. Cl. 357—67** **3 Claims**



**1.** A contact pad for a semiconductor die comprising:

an alloy of aluminum, platinum and gold wherein the percentages of each is given in percentages by weight of the alloy, said gold lying within the range of 99.4 to 97.75 percent, said platinum lying within the range of 0.5 to 1.75 percent, and said aluminum lying within the range of 0.1 to 0.5 percent.

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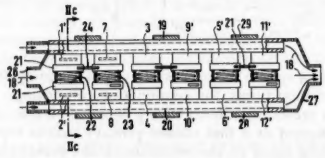
**3,921,201**

**IMPROVED LIQUID COOLED SEMICONDUCTOR DISK ARRANGEMENT**

**Max Eisele, Erlangen, and Günter Wilhelm, Wiesenthau, both of Germany, assignors to Siemens Aktiengesellschaft, Munich, Germany**

**Continuation of Ser. No. 324,796, Jan. 18, 1973, abandoned. This application July 15, 1974, Ser. No. 488,835**
**Claims priority, application Germany, Jan. 22, 1972, 2203032**
**Int. Cl.² H01L** *25/04*
**U.S. Cl. 357—82** **8 Claims**



**1.** A semiconductor arrangement, comprising: a plurality of semiconductor discs, each having ends forming contacts, disposed in a spaced-apart adjacent relationship;

a plurality of electrically conductive plates, disposed in space-apart parallel relationship in engagement with said discs and between which said discs are arranged, at least a pair of said plurality of semiconductor discs being disposed between said plates in an axially superimposed relationship;

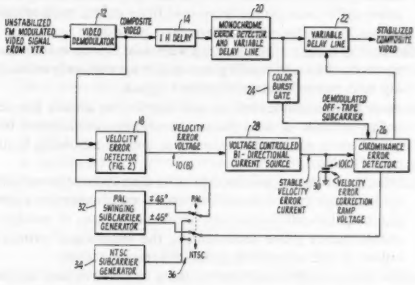
a plurality of coil springs, disposed between said axially superimposed discs, for pressing said discs into engagement with said plates; and

means, coupled to said plates, and including side walls interposed therebetween, for conducting a liquid coolant between said plates around said semiconductor discs.

## 3,921,202
## VIDEOTAPE RECORDER AND REPRODUCER VELOCITY COMPENSATOR APPARATUS

**Bert H. Dann, Los Altos, and Barrett E. Guisinger, Saratoga, both of Calif., assignors to International Video Corporation, Sunnyvale, Calif.**

**Filed Feb. 4, 1974, Ser. No. 439,093**
**Int. Cl.² H04N** *5/76, 9/02*
**U.S. Cl. 358—8** **8 Claims**




**1.** In a video tape recorder adapted for reproducing a recorded composite color video signal, said recorder receiving a reference color subcarrier signal, said recorder reproducing an uncorrected composite color video signal having line-to-line velocity errors and time base errors, velocity error detector apparatus comprising:

burst separator means receiving said uncorrected composite color video signal for separating the reproduced color subcarrier bursts from said video signal,

means for generating a sample signal in response to a zero crossing in each of said reproduced color subcarrier bursts,

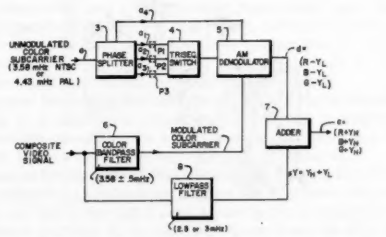
means receiving said reference color subcarrier for generating a plurality of repetitive signals at the reference color subcarrier rate, and

means receiving said sample signals for non-ambiguously sampling said repetitive signals as a four quadrant phase detector.

## 3,921,203
## TRISEQUENTIAL COLOR VIDEO RECORD-PLAYBACK METHOD AND CIRCUITS

**Bernard J. Okey, Claygate, England, assignor to BASF Aktiengesellschaft, Ludwigshafen (Rhine), Germany**

**Filed May 24, 1974, Ser. No. 473,221**
**Int. Cl.² H04N** *1/22, 9/32*
**U.S. Cl. 358—9** **10 Claims**




**1.** A method for demodulation of chrominance signals into trisequential form and for recombination of the trisequential signals comprising.

a. generating a three phase color subcarrier having the three phases of the received chrominance signals;

b. switching line sequentially the three phases of the subcarrier into an AM demodulator which produces three sequentially demodulated color difference signals;

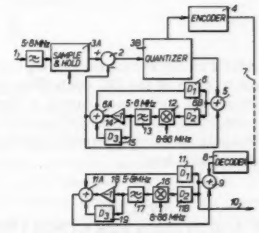
c. converting the three color difference signals into trisequential video signals, each consisting of one color signal and a luminance signal of high frequency during each line scan; and

d. recombining the trisequential video signals into a video signal of standard format.

## 3,921,204
## DIGITAL ENCODING SYSTEM

**John Edward Thompson, Watford, England, assignor to The Post Office, London, England**

**Filed Aug. 18, 1972, Ser. No. 281,807**
**Claims priority, application United Kingdom, Aug. 27, 1971, 40309/71**
**Int. Cl.² H04N** *5/40, 9/40*
**U.S. Cl. 358—13** **18 Claims**




**5.** A method of decoding a transmitted signal consisting of a series of encoded samples having a sampling frequency substantially equal to $Nf$, where N is a ratio of small integers, said method comprising the steps of decoding each incoming sample, and adding each incoming sample to the accumulated value of those preceding samples separated by substantially an integral number of cycles at frequency $f$ to provide an output signal, whereby a signal having a component of frequency $f$ is accurately reconstructed.

## 3,921,205
## D.C. CONTROLLED CHROMA CIRCUIT

**Yoshihiro Fujiwara, and Ryuhei Nakabe, both of Hirakata, Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan**

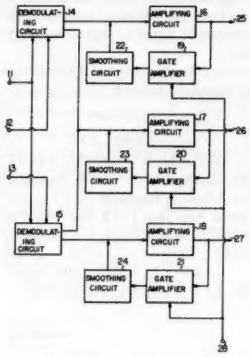
**Continuation of Ser. No. 284,557, Aug. 29, 1972, abandoned. This application May 6, 1974, Ser. No. 467,231**
**Claims priority, application Japan, Aug. 31, 1971, 46-67238; Aug. 31, 1971, 46-67244**
**Int. Cl.² H04N** *9/00*
**U.S. Cl. 358—34** **6 Claims**

**1.** In a color television receiver, a chroma controlling circuit comprising:

a plurality of first circuit means for demodulating a modulated chroma signal having a blanking period, said first circuit means having an input for a modulated chroma signal, an input for a reference subcarrier, an output for a demodulated color difference signal, and a DC controlling means coupling a received DC signal and said demodulated color difference signal, so that the DC level of the demodulated color difference signal at said output is dependent on said received DC signal, said demodulated color difference signal being directly coupled respectively to a power amplifier circuit for driving a color picture tube;

a plurality of second circuit means for extracting respectively the DC level of each color difference signal over a

portion of the blanking period, said second circuit means having an input for a color difference signal and an output for a continuous DC signal proportional to the respective extracted DC level; and




a plurality of third circuit means for feeding continuous DC signals back to each of the DC controlling means of the first circuit means for demodulating a chroma signal, thereby maintaining a quiescent DC level at said output for the demodulated color difference signal at a substantially predetermined level.

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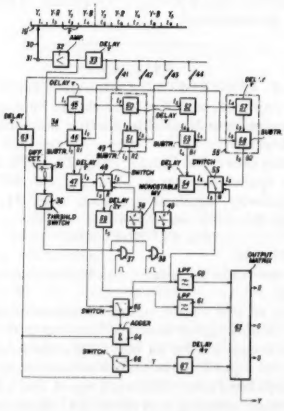
**3,921,206**

## METHOD OF AND SYSTEM FOR GENERATING VIDEO SIGNALS IN COLOR TELEVISION

**Kurt Bohm, Vienna, and Robert Scheiber, Wiener Neudorf, both of Austria, assignors to Karl Vockenhuber and Rainund Hauser, both of Vienna, Austria**

**Filed Dec. 28, 1973, Ser. No. 429,695**
**Claims priority, application Austria, Jan. 3, 1973, 44/73**
**Int. Cl.[2] H04N** *9/04, 9/07, 9/32*
**U.S. Cl. 358—41** **17 Claims**



1. A system for generating luminance and color signals for the transmission of color-television images over an outgoing video channel, comprising:

a photosensitive screen adapted to receive the projected image of an object;

a mask interposed between said screen and the location of said object, said mask being subdivided into a multiplicity of parallel strips of different light transmissivity, said strips being divided into groups of four with an invariable sequence of a first transparent strip passing all three additive primary colors of the visible spectrum, a first filter strip suppressing one of said primary colors, a second transparent strip substantially identical with said first transparent strip, and a second filter strip suppressing another of said primary colors;

electronic reading means provided with sweep means for scanning said screen along lines transverse to said strips to produce an electrical output signal composed of luminance pulses from said transparent strips alternating with color-difference pulses from said filter strips, each of said pulses lasting for a predetermined period;

distributor means synchronized with said sweep means and connected to said reading means for successively extracting said pulses from said output signal;

storage means connected to said distributor means for delaying certain of said pulses to obtain coincidence between each color-difference pulse and an adjoining luminance pulse;

subtractor means connected to said distributor means and said storage means for differentially combining the coincident color-difference and luminance pulses to produce chrominance pulse representing the suppressed primary colors of the respective color-difference pulses;

adder means with input connections to said reading means and said substractor means for combining said chrominance pulses with complementary color-difference pulses to produce reconstituted luminance pulses during intervals between luminance pulses directly obtained from said output signal; and

switch means connected to said adder means and said reading means for interleaving said directly obtained luminance pulses with said reconstituted luminance pulses.

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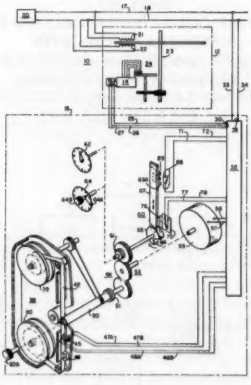
**3,921,207**

## OUTAGE INDICATING APPARATUS FOR METER TELEMETRY SYSTEMS INCLUDING DATA RECORDERS

**William P. Doby, and Albert H. Maxwell, Jr., both of Raleigh, N.C., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.**

**Filed Sept. 26, 1974, Ser. No. 509,612**
**Int. Cl.[2] G01D** *9/04*; **G01R** *13/04*
**U.S. Cl. 360—6** **8 Claims**



1. A data recorder for recording metering information of a measured quantity subject to an interruption during an outage condition, comprising:

a data input for receiving pulses responsive to predetermined amounts of a measured quantity;

a time impulse control means actuated at regular time intervals;

a switching control means having one conductive condition in response to presence of said measured quantity and an opposite conductive condition in response to the absence of said measured quantity;

a data recording circuit means connected to said data input to generate data recording pulses;

a time recording circuit means including said time impulse control means to generate time interval recording pulses in response to each actuation of said time impulse control means;

an outage indicating circuit means including said switching control means, said outage indicating circuit means being connected to said time recording circuit means to generate a separate outage recording pulse in said time recording circuit in response to said switching control means being operated between said one and said opposite conductive conditions such that said outage recording pulse is produced in a predetermined relationship with respect to a time interval pulse generated immediately after an outage condition in said measured quantity.

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**3,921,208**

## CONTACT DUPLICATION OF MAGNETIC SIGNALS UTILIZING A DUAL-MATERIAL INTERMEDIATE INCLUDING BOTH LOW $T_c$ AND HIGH $T_c$ MATERIAL

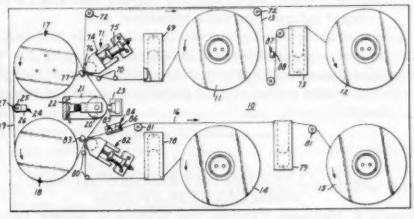
**Jack C. Chapman, Bloomington, Minn., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.**

**Filed Feb. 20, 1973, Ser. No. 333,876**

*Disclosure was also published under Trial Voluntary Protest Program on Jan. 28, 1975.*

**Int. Cl.² G11B** *5/86, 23/00*

**U.S. Cl. 360—17** **15 Claims**



**6.** System for making direct-image copies of magnetic signals from a master magnetic recording medium onto a copy magnetic recording medium, which system comprises:

1. an intermediate comprising a backing member of low permeability and a magnetizable face comprising a first magnetizable material having high $H_c$ relative to the $H_c$ of the copy medium and a low Curie temperature $T_c$ and a second magnetizable material of relatively high $T_c$ and low $H_c$ relative to the $H_c$ of the master medium,
2. means for moving the master medium and the intermediate in intimate face-to-face contact through a magnetic field for stimulating the high $T_c$ material of the intermediate to copy the signals onto the high $T_c$ material,
3. means for heating the magnetizable material of the intermediate to a temperature at least approximating the low $T_c$ but below the high $T_c$ and for cooling to a temperature below said low $T_c$ to copy the signals from the high $T_c$ material onto the low $T_c$ material of the intermediate, and
4. means for moving the intermediate and the copy medium in intimate face-to-face contact through a magnetic field for stimulating the copy medium the signals from the low $T_c$ material onto the copy medium.

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**3,921,209**

## DIGITAL RECORDING AND REPRODUCING SYSTEM EMPLOYING ΔPCM

**Hirokazu Yoshino, Katano; Tetsuo Yamaguchi, Hirakata; Eiichi Tsuboka, Nara, and Hiroshi Hatano, Katano, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan**

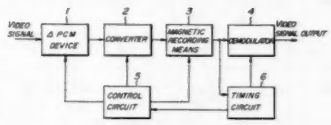
**Filed June 13, 1972, Ser. No. 262,287**

**Claims priority, application Japan, June 18, 1971, 46-44297; June 18, 1971, 46-44318; Dec. 8, 1971, 46-99745**

*Disclosure was also published under Trial Voluntary Protest Program on Jan. 28, 1975.*

**Int. Cl.² G11B** *5/02*

**U.S. Cl. 360—32** **3 Claims**




**1.** A magnetic recording and reproducing system comprising means for converting a signal to be recorded into an ΔPCM code of binary code signals arranged in parallel in $n$ bits, means for converting said binary code signals arranged in parallel in $n$ bits into code signals corresponding to said respective bits in the form of an NRZ code, and means for recording and reproducing signals from the code signals in an NRZ code of $n$ channels on a recording medium of at least n channels by magnetic heads corresponding to the respective channels.

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**3,921,210**

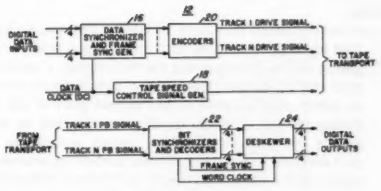
## HIGH DENSITY DATA PROCESSING SYSTEM

**Peter H. Halpern, Longwood, Fla., assignor to General Dynamics, St. Louis, Mo.**

**Filed Jan. 14, 1974, Ser. No. 432,938**

**Int. Cl.² G11B** *5/02*

**U.S. Cl. 360—40** **16 Claims**




**1.** A system for processing digital data for high density magnetic recording which comprises

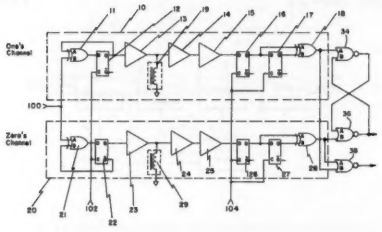
means for providing consecutive words each constituted of a certain number of bits of said data,

and means for encoding said words into different signals representing different ones of said words, said signals being of predetermined duration and having a spectral response characteristics matched to the spectral response of the magnetic recording system with the power density of the difference between said different signals of optimal magnitude.

## 3,921,211
## SELF-CLOCKING, TWO-CHANNEL DIGITAL MAGNETIC RECORDING/PLAYBACK METHOD AND APPARATUS

**Chung C. Tung, Santa Clara, and Robert D. Schweizer, Sunnyvale, both of Calif., assignors to Hewlett-Packard Company, Palo Alto, Calif.**

**Filed Oct. 17, 1973, Ser. No. 407,400**
**Int. Cl. G11b 5/09**
**U.S. Cl. 360—47** **8 Claims**

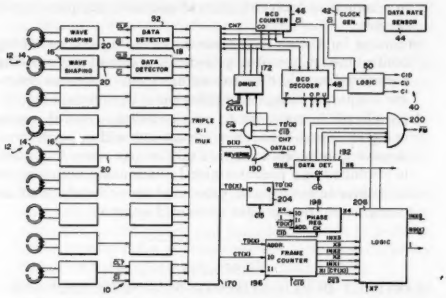


1. A self-clocking two-channel apparatus for recording a data signal having first and second phases representing one-bits and zero-bits, respectively, of uncoded serial digital data on a magnetic recording medium, said apparatus comprising:
a first channel including first gating means having first and second input ports and an output port for receiving the data signal at the first input port thereof, first switching means having an input port coupled to the output port of the first gating means, a clock input port coupled to a first source of regularly recurring pulses and a true output port coupled to the second input port of the first gating means, and first magnetic head coupled to the true output port of the first switching means for recording one-bits of digital information in the form of reversals of magnetic flux polarity on one track of the recording medium in response to changes in the phase of the signal at the true output port of the first switching means, said reversed flux polarity continuing until the next one-bit of digital information is received and said changes of that last-mentioned phase occurring during the occurrence of one of the regularly recurring pulses and in response to changes in the phase of the signal at the output port of the first gating means;
a second channel including second gating means having a first input port coupled to the first input port of the first gating means for receiving the data signal, a second input port and an output port, second switching means having an input port coupled to the output port of the second gating means, a clock input port coupled to the first source of regularly recurring pulses, a not-true output port coupled to the second input port of the second gating means and a true output port, and second magnetic head coupled to the true output port of the second switching means for recording zero-bits of digital information in the form of reversals of magnetic flux polarity on another track of the recording medium in response to changes in the phase of the signal at the true output port of the second switching means, said reversal flux polarity continuing until the next zero-bit of digital information is received and said changes of that last-mentioned phase occurring during occurrence of one of the regularly recurring pulses and in response to changes in the phase of the signal at the output port of the second gating means; said changes in the signal at the output ports of the first and second gating means occurring in response to changes in the relative phase of the signals coupled to the first and second input ports of the first and second gating means.

## 3,921,212
## READ CIRCUIT AND PROCESS FOR READING MULTI-RACK RECORDED INFORMATION WITH PARTIAL TIME MULTIPLEXING

**Martin D. Gray, Sierra Madre, Calif., assignor to C. J. Kennedy Company, Altadena, Calif.**

**Filed Dec. 2, 1974, Ser. No. 528,808**
**Int. Cl. G11b 5/02**
**U.S. Cl. 360—51** **33 Claims**

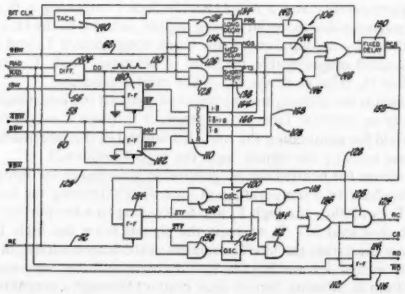


1. A system for simultaneously reading information from a plurality of information tracks which are recorded in a self-clocking data format, the system comprising:
a plurality of first subsystems, each being responsive to information recorded on a different track and each including:
circuitry connected to detect and indicate an information state transition of recorded information;
circuitry connected to sense and indicate a current information state of recorded information; and
circuitry connected to indicate elapsed time since a most recent information state transition; and
a second subsystem connected to periodically and sequentially sample information indicated by each of the first subsystems and generate data signals indicative of data information recorded on a plurality of tracks in response thereto.

## 3,921,213
## SELF-CLOCKING NRZ RECORDING AND REPRODUCTION SYSTEM

**Ronald P. McGrath, Livonia, and William A. Bleher, Detroit, both of Mich., assignors to General Instrument Corporation, Hawthorne, Calif.**

**Division of Ser. No. 235,583, March 17, 1972, Pat. No. 3,815,108. This application Aug. 9, 1974, Ser. No. 496,091**
**Int. Cl.[2] G11B 5/02**
**U.S. Cl. 360—51** **6 Claims**



1. A magnetic memory system including a magnetic storage medium comprising: a source of clock signals, data writing

means responsive to said clock signals for writing into the magnetic storage medium flux transitions according to an NRZ code and representing digital information in accordance with the occurrence of said clock signals, counter means connected between said clock signal source and said writing means for determining every *n*th clock signal, and control means operatively associated with said data writing means for providing for the writing by said data writing means of a guaranteed flux transition for sync purposes during the time the nth clock signal is blocked.

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**3,921,214**

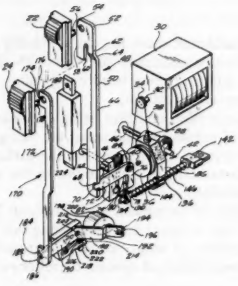
## CONTROL MECHANISM FOR HAND-HELD DICTATION APPARATUS WITH ERASURE PREVENTION CAPABILITIES

**Willy Nyffenegger, Unterehrendingen, Switzerland, assignor to Dictaphone Corporation, South Norwalk, Conn.**

**Filed June 7, 1973, Ser. No. 367,750**

**Int. Cl.[2] G11B** *15/04*

**U.S. Cl. 360—60** **10 Claims**



**1.** A control mechanism for a hand-held dictation apparatus which includes a casing enclosing said dictation apparatus and a chassis assembly secured within said casing adapted to operatively support the components of said dictation apparatus, said control mechanism comprising:

a first switch assembly including a slide switch element accessible from exterior said casing and movable to operatively control the forward drive, stop and reverse drive modes for the recording medium,

a second switch assembly including a slide switch element accessible from exterior said casing and movable to operatively control the record and playback modes of said apparatus,

said first and second slide switch elements being movable along a path within the same plane, and

said first and second switch assemblies including linkage means movable along a straight line path in a closely adjacent parallel plane for interrelating said switch assemblies to move said second switch assembly into playback mode responsive to said first switch assembly movement into reverse drive mode.

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**3,921,215**

## MAGNETIC RECORDING AND REPRODUCING SYSTEM WITH TAPE COUNTER

**Etsuji Asami, Hirakata, Japan, assignor to Matsushita Electric Industrial Co., Ltd., Osaka, Japan**

**Filed June 24, 1974, Ser. No. 482,583**

**Claims priority, application Japan, June 28, 1973, 48-73471; July 4, 1973, 48-76054**

**Int. Cl.[2] G11B** *15/18, 15/44, 15/50*

**U.S. Cl. 360—74** **7 Claims**

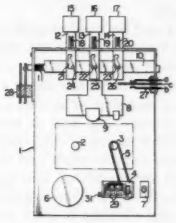
**1.** A magnetic recording and reproducing system comprising:

first means for obtaining a playback operation and including a playback lever,

second means for obtaining a rewind operation and including a rewind lever,

third means for obtaining a fast feed operation and including a fast feed lever,

fourth means for operating said means for obtaining the rewind or fast feet operation by interrupting the playback operation without restoring the playback lever with the driving of the rewind lever or fast feed lever,



fifth means for manually or automatically restoring the rewind lever or fast feed lever for the purpose of resuming the playback operation by rendering the means for obtaining the rewind or fast feed operation inoperative, said fifth means comprising a first slidable lever having means for locking the rewind and fast feed levers in the operative state and a second slidable lever having means for locking the playback lever in the operative state, and

means for deviating said first slidable lever in a direction not to lock said rewind and fast feed levers by said playback lever at the time of operation of the same.

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**3,921,216**

## HEAD TRACK CHANGE AND CARTRIDGE EJECT UTILIZING CAPSTAN DRIVE

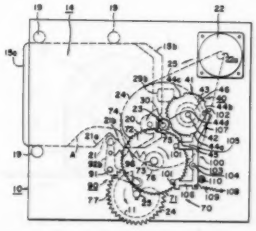
**Shoji Wada, Kyoto, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan, JA**

**Filed Feb. 2, 1973, Ser. No. 329,015**

**Claims priority, application Japan, Feb. 3, 1972, 47-12390; Mar. 28, 1972, 47-31044**

**Int. Cl. G11b** *5/55, 21/08, 15/18*

**U.S. Cl. 360—106** **10 Claims**



**1.** A cartridge type tape player comprising:

at least one tape cartridge containing a tape having a plurality of tracks thereon;

at least one reproducing head disposed adjacent to said cartridge;

a capstan shaft driven by a driving means for moving the tape of said cartridge past said reproducing head and having a pinion gear rotatably mounted thereon;

first control means connectable with said capstan shaft and driven by said capstan shaft when connected with said capstan shaft for vertically shifting said reproducing head

relative to said cartridge so as to achieve a track changing operation when a program upon a prior track of said tape has been completed;

second control means connectable with said capstan shaft and driven by said capstan shaft when connected with said capstan shaft for shifting said cartridge toward and away from said reproducing head to reproducing and non-reproducing stations for reproducing and storing said cartridge, respectively;

control element means for controlling said connections between said first and second control means and said capstan shaft;

at least one of said first and second control means comprising a gear element having a notched portion upon at least one portion of said gear which when disposed opposite said pinion gear defines a stable condition for said gear element and said first or second control means whereby said gear element and said at least one of said first or second control means is disconnected from said pinion gear and said capstan shaft and thereby inactivated and wherein the remainder of said gear element is formed with gear teeth which when disposed opposite said pinion gear, said gear element is in an activated condition as a result of being interlocked with and driven by said pinion gear whereby said at least one of said first and second control means may be activated,

said control element means comprises a pivotable alert lever; and

means mounting said alert lever between a first position and a second position, movement of said alert lever from said first position to said second position causing rotation of said gear element from said stable condition to said activated condition, as a result of which rotation, said teeth of said gear element become interlocked with said pinion gear.

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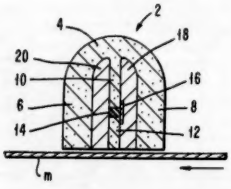
## 3,921,217
## THREE-LEGGED MAGNETIC RECORDING HEAD USING A MAGNETORESTIVE ELEMENT

**David A. Thompson, Somers, N.Y., assignor to International Business Machines Corporation, Armonk, N.Y.**

**Continuation of Ser. No. 212,591, Dec. 27, 1971, abandoned.**
**This application June 20, 1973, Ser. No. 371,787**
*Disclosure was also published under Trial Voluntary Protest Program on Jan. 28, 1975.*
**Int. Cl.[2] G11B** *05/12, 5/22*
**U.S. Cl. 360—113** **28 Claims**

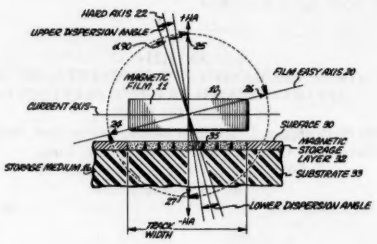



**18.** A magnetic head containing two outer permeable shielding members, each shielding member having one face essentially in proximity with the magnetic recording medium and each having one inner face essentially perpendicular to said magnetic recording medium, said inner faces being substantially parallel, and defining a magnetic gap, and within said gap a magnetically permeable member containing a highly permeable, thin film magnetoresistive layer, said magnetoresistive layer being substantially aligned in the direction of its width *w* with a plane essentially parallel to said inner faces of said shielding members, and in a flux-coupling relationship with said magnetic recording medium, said gap being less than said width *w*.

## 3,921,218
## THIN FILM MAGNETORESISTIVE TRANSDUCERS WITH ROTATED MAGNETIC EASY AXIS

**Wolfgang W. O. G. Kayser, Paradise Valley, Ariz., assignor to Honeywell Information Systems Inc., Waltham, Mass.**

**Filed Dec. 26, 1973, Ser. No. 428,581**
**Int. Cl.[2] G11B** *5/14, 5/28;* **G11C** *11/14*
**U.S. Cl. 360—113** **3 Claims**




**1.** A multitrack recording head having a plurality of magnetoresistive transducers for use with a magnetic storage medium, said recording head comprising:

an elongated substrate;

a magnetic film, said film being deposited upon the surface of said substrate, said substrate being mounted adjacent said storage medium so that the surface of said substrate is substantially at right angles to the surface of said storage medium;

a plurality of terminals, said terminals being connected to said film at space intervals along said substrate; and

the plurality of magnetoresistive transducers sharing said common terminal spaced therebetween.

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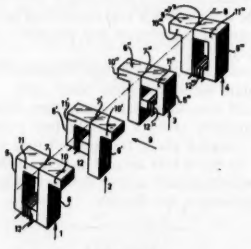
## 3,921,219
## MULTI-CHANNEL MAGNETIC HEAD

**Herman Cornelis Lalesse, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.**

**Filed Mar. 27, 1974, Ser. No. 455,400**
**Claims priority, application Netherlands, Mar. 31, 1973, 7304528**
**Int. Cl.[2] G11B** *5/22*
**U.S. Cl. 360—121** **6 Claims**



**1.** A multi-channel magnetic head comprising a plurality of magnetic cores, each having an electric winding, each core being separated from each adjacent core by non-magnetic material, each core comprising a first and a second pole tip of equal dimensions which enclose an operation gap, said operational gaps being disposed in a straight line and said windings of successive cores are shifted relative to each other to facilitate a more compact assembly, said first pole tips form part of U-shaped core parts and said second pole tips form part of L-shaped core parts, the short limb of an L having substantially the same length as an upright limb of a U, and in which

the outside of the long limb of an L and the end face of at least one upright limb of the U are always located opposite to each other while enclosing an operational gap.

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## 3,921,220
## APPARATUS FOR AUTOMATIC HIGH SPEED POSITIONING OF MAGNETIC RECORDING TAPE BY SENSING REEL REVOLUTIONS FROM TAPE BEGINNING

**Herbert F. Primosch, Tustin, and Allen E. Fisher, West Covina, both of Calif., assignors to Odetics, Inc., Anaheim, Calif.**

**Filed July 15, 1974, Ser. No. 488,309**
**Int. Cl. G11b** *15/18;* **B65m** *59/38*
**U.S. Cl. 360—72** **21 Claims**

**1.** Apparatus for use with a standard tape player of the type including a tape drive mechanism for transporting magnetic tape from a supply reel to a take-up reel, for automatically locating a prerecorded message on said tape comprising:

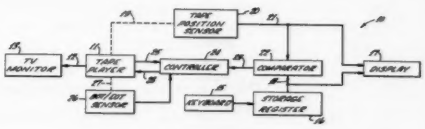
manual means for selecting a first number which corresponds to the location of said prerecorded message on said tape, said first number being indicative of the desired number of revolutions of one of said tape reels from the beginning of said tape;

means for storing said first number;

means operatively coupled to said tape player and including means for sensing the rotation of said one tape reel for generating a second number indicative of the actual number of revolutions of said one tape reel from said beginning of said tape;

means for comparing said first and second numbers; and

means operatively coupled to said comparing means and




responsive to the absence of coincidence between said first and second numbers for signaling said tape player to advance or rewind, at a high speed, in a direction to decrease the difference between said first and second numbers, said signaling means being responsive to coincidence between said first and second numbers for signaling said tape player to automatically play said tape at low speed.

# DESIGN PATENTS

## GRANTED NOVEMBER 18, 1975

### ERRATA

| For CLASS | See PATENT NO. |
|---|---|
| 003-019 A | 237,667 |
| 003-006 | 237,690 |
| 010-123 | 237,706 |

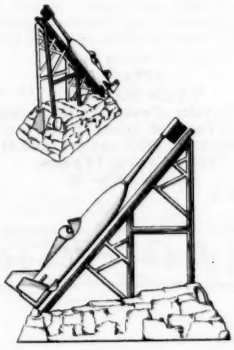
# DESIGNS

NOVEMBER 18, 1975

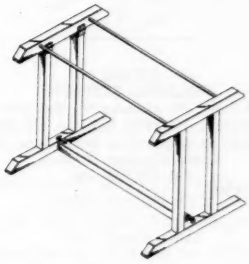
237,657
**COMBINED TOE SOCK AND TONGUE FOR WEAR WITH BOOTS**
Michael W. Marriner, 3009 Bern Drive, Laguna Beach, Calif. 92651
Filed Aug. 12, 1974, Ser. No. 496,563
Term of patent 14 years
Int. Cl. D2—*04*
U.S. Cl. D2—330

237,658
**SPOOL HOLDER**
Stig Boman, Billdal, and Rolf Wallin, Floda, Sweden, assignors to Molnlycke AB, Goteborg, Sweden
Filed May 14, 1973, Ser. No. 359,778
Claims priority, application Sweden Nov. 13, 1972
Term of patent 14 years
Int. Cl. D3—*01*
U.S. Cl. D3—19 D

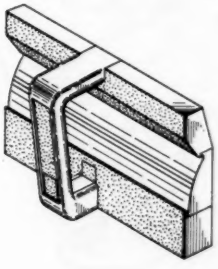
237,659
**TOOTHBRUSH AND HOLDER THEREFOR**
Burton C. Meyer, Downers Grove, and Joseph M. Burck, Chicago, Ill., assignors to Marvin Glass & Associates, Chicago, Ill.
Filed Dec. 6, 1974, Ser. No. 530,056
Term of patent 14 years
Int. Cl. D4—*02*
U.S. Cl. D4—18



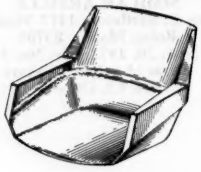
237,660
**FOLDING RACK FOR DOLL CLOTHES OR SIMILAR ARTICLE**
Warren C. Bertleson, 1417 Vista Ave., Boise, Idaho 83705
Filed Nov. 30, 1972, Ser. No. 311,049
Term of patent 14 years
Int. Cl. D6—*99*
U.S. Cl. D6—6



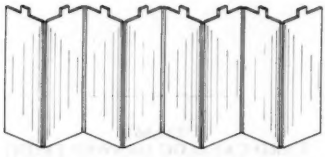
237,661
**CARD CATALOG DRAWER FRONT**
Carl H. Little, Jamestown, N.Y., assignor to Weber-Knapp Company, Jamestown, N.Y.
Filed Mar. 29, 1973, Ser. No. 345,963
Term of patent 14 years
Int. Cl. D6—*06*
U.S. Cl. D6—192



237,662
SEAT UNIT
Vladimir Subert, Mount-Royal, Quebec, Canada, assignor to Georges Vondrejs, Longueil, Quebec, Canada
Filed Oct. 12, 1973, Ser. No. 406,018
Term of patent 14 years
Int. Cl. D6—*06*
U.S. Cl. D6—197

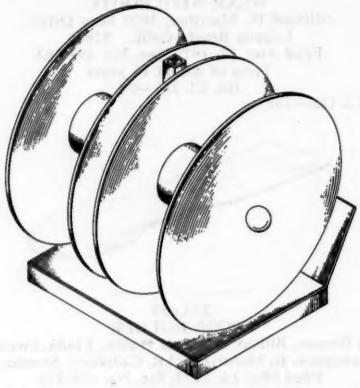


237,663
FOLDING SCREEN
Abraham Levy, 44 Alumim St., Tel-Aviv, Israel
Filed Oct. 26, 1973, Ser. No. 409,855
Claims priority, application Israel June 20, 1973
Term of patent 14 years
Int. Cl. D6—*06*
U.S. Cl. D6—139

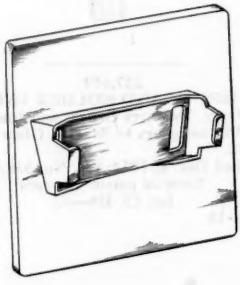


237,664
CHAIR
Eugene J. Costabile, Oak Lawn, Ill., assignor to Futorian Corporation, Amsterdam, N.Y.
Filed Dec. 14, 1973, Ser. No. 424,974
Term of patent 14 years
Int. Cl. D6—*01*
U.S. Cl. D6—26

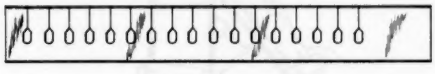
237,665
DISPLAY STAND FOR TAPE CASSETTES
Leonard Marshall Schultz, Los Angeles, Calif., assignor to Newaudio, Inc.
Filed Dec. 26, 1973, Ser. No. 428,522
Term of patent 14 years
Int. Cl. D20—*02*; XD6—*04*
U.S. Cl. D6—85



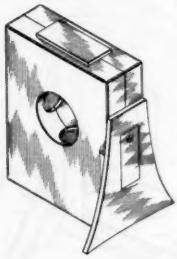
237,666
RAZOR HOLDER
Clemens A. Iten, Staunton, Va., assignor to Philip Morris Incorporated, New York, N.Y.
Filed Mar. 11, 1974, Ser. No. 449,612
Term of patent 14 years
Int. Cl. D6—*06*
U.S. Cl. D6—88



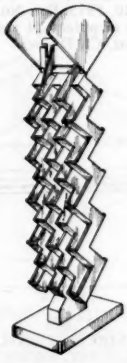
237,667
YARN HOLDER
Alvan M. Percelay, Pawtucket, R.I., assignor to Craft Yarns of Rhode Island, Inc.
Filed Sept. 24, 1973, Ser. No. 400,417
Term of patent 14 years
Int. Cl. D15—*06*
U.S. Cl. D3—19 A



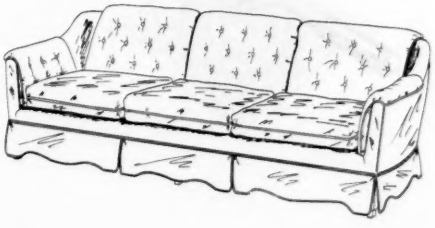
237,668
MULTIPLE LOCK MOUNT
Thomas P. Hufford, Foster City, and Hollis L. De Vines, Pacifica, Calif., assignors to Schlage Lock Company, San Francisco, Calif.
Filed Aug. 30, 1972, Ser. No. 284,994
Term of patent 14 years
Int. Cl. D6—*06*
U.S. Cl. D6—85



237,669
DISPLAY POST
Ettore Neglia, San Giorgio Canavese, Italy, assignor to P. Ferrero & C. S.p.A., Alba, Cuneo, Italy
Filed June 22, 1973, Ser. No. 372,867
Claims priority, application Italy Dec. 22, 1972
Term of patent 14 years
Int. Cl. D6—*04*
U.S. Cl. D6—24

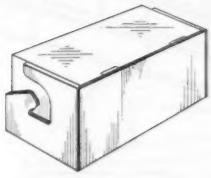


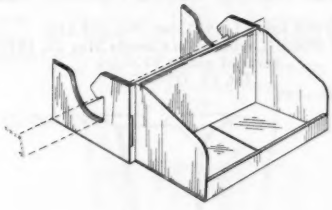
237,670
SOFA
Morris F. Fisher, Carmel, Ind., assignor to Jackson Chair Company, Inc., Danville, Ky.
Filed Mar. 25, 1974, Ser. No. 454,119
Term of patent 14 years
Int. Cl. D6—*01*
U.S. Cl. D6—63



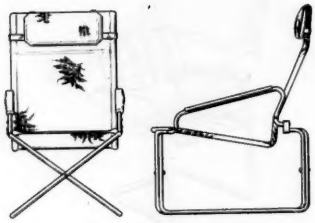
237,671
CHAIR
Raymond Grosfillex, Arbent, France, assignor to Grosfillex S.A.R.L., Arbent, France
Filed May 9, 1974, Ser. No. 468,494
Claims priority, application France Nov. 16, 1973
Term of patent 7 years
Int. Cl. D6—*01*
U.S. Cl. D6—56

237,672
SHELF HANGING DISPLAY CONTAINER OR SIMILAR ARTICLE
Ronald H. Taub, Highland Park, Ill., assignor to Taub Family Trust
Filed May 28, 1974, Ser. No. 473,410
Term of patent 14 years
Int. Cl. D20—*02*
U.S. Cl. D6—199

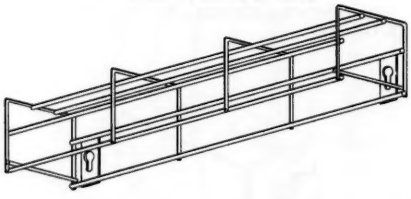




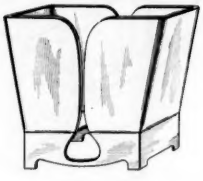
237,673
**FOLDABLE CHAIR**
Suekichi Uchida, Niwa-gun, Aichi-ken, Japan, assignor to Uchida Sharyo Co., Ltd., Nagoya, Japan
Filed June 13, 1974, Ser. No. 478,949
Claims priority, application Japan Dec. 24, 1973
Term of patent 14 years
Int. Cl. D6—*01*
U.S. Cl. D6—69



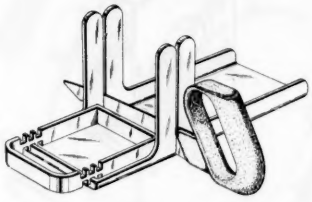
237,674
**BOTTLE RACK**
Eric N. Seltzer, 7766 Burnet Ave., Van Nuys, Calif. 91405
Filed July 1, 1974, Ser. No. 484,710
Term of patent 14 years
Int. Cl. D6—*04*
U.S. Cl. D6—130



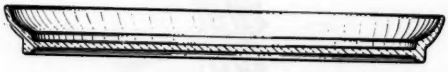
237,675
**BASKET**
John J. Cameron, Ottawa, Ontario, Canada, assignor to Jayscam Industries, Limited, Unionville, Ontario, Canada
Filed July 11, 1973, Ser. No. 378,131
Claims priority, application Canada May 24, 1973
Term of patent 14 years
Int. Cl. D7—*07*
U.S. Cl. D7—189



237,676
**COMBINED FOODSTUFF SLICER GUIDE AND SLICING KNIFE**
Maria Benktzon, Sollentuna, and Sven-Eric Juhlin, Gustavsberg, Sweden, assignors to AB Gustavsberg Fabriker, Gustavsberg, Sweden
Filed Oct. 25, 1973, Ser. No. 409,735
Claims priority, application Sweden May 2, 1973
Term of patent 14 years
Int. Cl. D7—*04*
U.S. Cl. D7—43

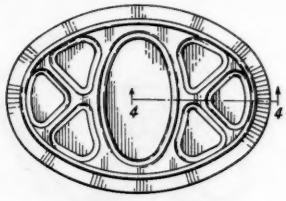


237,677
**PLATE**
Gerald Gulotta, New City, N.Y., assignor to Block China Corporation, New York, N.Y.
Filed Dec. 20, 1973, Ser. No. 426,930
Term of patent 14 years
Int. Cl. D7—*01*
U.S. Cl. D7—23

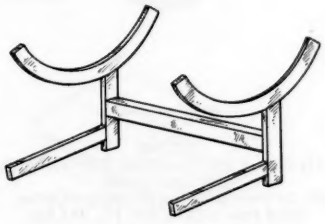


237,678
**FIREARM CHAMBER LUBRICATING AND CLEANING DEVICE**
Louis L. Spencer, 293 W. State St., Pleasantville, Pa. 16341
Filed Feb. 12, 1974, Ser. No. 441,862
Term of patent 14 years
Int. Cl. D7—*05*
U.S. Cl. D7—179

237,679
**DISPOSABLE FOOD TRAY**
Harry A. Backus, 370 Neeb Road, Cincinnati, Ohio 45238
Filed July 26, 1974, Ser. No. 492,218
Term of patent 14 years
Int. Cl. D7—*99*
U.S. Cl. D7—38



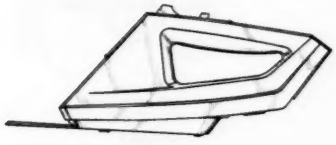
237,680
**BACKLOG HOLDER**
William W. Wood, 2935 Fairlee Drive, Fairfax, Va. 22030
Filed Mar. 21, 1975, Ser. No. 560,321
Term of patent 14 years
Int. Cl. D7—*08*
U.S. Cl. D7—207



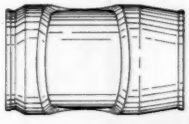
237,681
**ROOF INSULATION WASHER**
Rudolph Ernst Knohl, Bartlett, and Robert Victor Enstrom, Oak Park, Ill., assignors to Illinois Tool Works Inc., Chicago, Ill.
Filed Nov. 19, 1973, Ser. No. 417,449
Term of patent 14 years
Int. Cl. D8—*08*
U.S. Cl. D8—274

237,682
**WELDING GUN**
Bengt Einar Palmgren, Saltsjobaden, Sweden, assignor to Elektriska Svetsningsaktiebolaget, Goteborg, Sweden
Filed Feb. 28, 1974, Ser. No. 446,823
Term of patent 14 years
Int. Cl. D8—*05*
U.S. Cl. D8—30

237,683
**CORDLESS ELECTRIC GRASS SHEAR**
Donald J. Behnk, Allison Park, and James E. Edgell, Bradford Woods, Pa., assignors to Disston, Inc., Pittsburgh, Pa.
Filed July 12, 1974, Ser. No. 488,174
Term of patent 14 years
Int. Cl. D8—*01*
U.S. Cl. D8—8

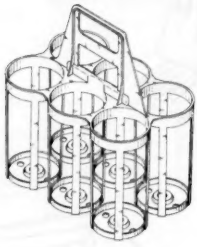


237,684
**CONTAINER BODY**
Kenneth G. Koprowski, 14249 S. Western Ave., Blue Island, Ill. 60406, and Carment T. Mascia, 18 W. 125 Rogers Court, Westmont, Ill. 60559
Filed Aug. 3, 1973, Ser. No. 385,497
Term of patent 14 years
Int. Cl. D9—*03*
U.S. Cl. D9—216

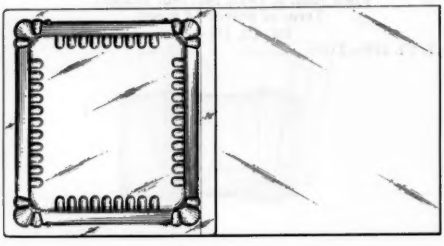


237,685
**BOTTLE OR THE LIKE**
Stanley Herbert Picker, Kingston Hill, England, assignor to Mary Quant Cosmetics Limited, Surbiton, Surrey, England
Filed Sept. 24, 1973, Ser. No. 400,131
Claims priority, application Great Britain May 15, 1973
Term of patent 14 years
Int. Cl. D9—*01*
U.S. Cl. D9—169

237,686
**CARRIER FOR BEVERAGE CONTAINERS**
Evald Torokvei, 12 Alderbrook Drive, Don Mills, Ontario, Canada
Filed Jan. 9, 1974, Ser. No. 431,907
Term of patent 14 years
Int. Cl. D9—*03*
U.S. Cl. D9—179



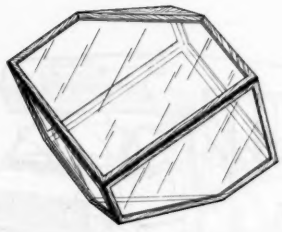
237,687
**FOOD CONTAINER PACKAGE**
Daniel Bernhardt, Palisade, N.J.
(406 N. Midland Ave., Saddle Brook, N.J. 07662)
Filed June 7, 1974, Ser. No. 477,450
Term of patent 14 years
Int. Cl. D9—*03*
U.S. Cl. D9—192



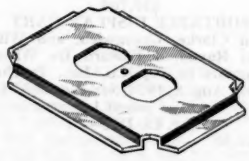
237,688
**COMBINED BOTTLE AND DISPENSING CUP**
Wolfgang Julius Emil Bottger, Berlin, Germany, assignor to Bottger Kommanditgesellschaft, Berlin, Germany
Filed June 18, 1974, Ser. No. 480,341
Claims priority, application Germany Feb. 9, 1974
Term of patent 14 years
Int. Cl. D9—*01*
U.S. Cl. D9—10

237,689
**LID FOR A PACKAGING CONTAINER OR THE LIKE**
Paul Davis, 18 Parsons Drive, Swampscott, Mass. 01907
Filed July 1, 1974, Ser. No. 484,938
Term of patent 14 years
Int. Cl. D9—*07*
U.S. Cl. D9—267

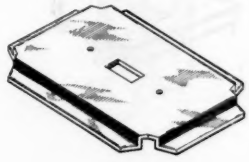
237,690
**FRAMED AQUARIUM**
Boyd R. Johnson, 519 C St., Salt Lake City, Utah 84103
Filed Aug. 16, 1973, Ser. No. 388,863
Term of patent 14 years
Int. Cl. D30—*02*
U.S. Cl. D30—6



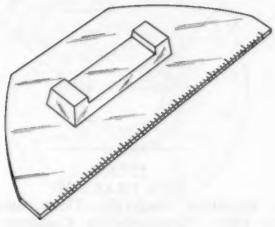
237,691
**WALL SOCKET TEMPLATE**
John Douglass Black, 9332 Ambassador Drive, Westminster, Calif. 92683
Filed Apr. 24, 1974, Ser. No. 463,509
Term of patent 14 years
Int. Cl. D10—*99*
U.S. Cl. D10—64



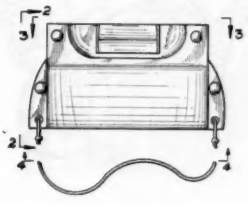
237,692
**SWITCH PLATE TEMPLATE**
John Douglass Black, 9332 Ambassador Drive, Westminster, Calif. 92683
Filed Apr. 24, 1974, Ser. No. 463,510
Term of patent 14 years
Int. Cl. D10—*99*
U.S. Cl. D10—64



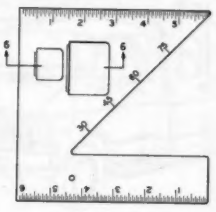
237,693
**DRAFTING INSTRUMENT**
Peter S. Hoagland, 18769 Saratoga, Lathrup Village, Mich. 48076
Original design application Dec. 15, 1971, Ser. No. 208,511, now Patent No. 232,051, which is a continuation-in-part of design application Ser. No. 160,234, July 6, 1971, now Patent No. 226,226. Divided and this application Jan. 2, 1974, Ser. No. 429,872
Term of patent 14 years
Int. Cl. D10—*04*
U.S. Cl. D10—62



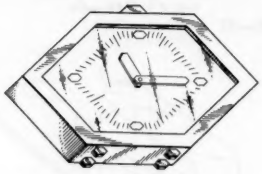
237,694
**TURKEY CALLER**
Franklin E. Horne, Rte. 2, Brent, Ala. 35034
Filed Feb. 8, 1974, Ser. No. 440,848
Term of patent 14 years
Int. Cl. D10—*06*
U.S. Cl. D10—119



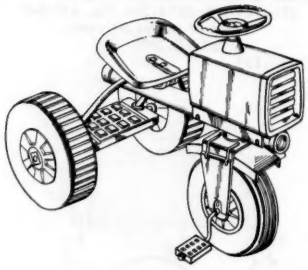
237,695
**TAPE MEASURE HOLDING SQUARE**
Clarence Ose, R.R. 1, Echo, Minn. 56237
Filed June 17, 1974, Ser. No. 479,984
Term of patent 14 years
Int. Cl. D10—*04*
U.S. Cl. D10—65



237,696
CLOCK
Arthur W. Haydon, Middlebury, Conn., assignor to Tri-Tech, Inc.
Filed June 24, 1974, Ser. No. 482,526
Term of patent 14 years
Int. Cl. D10—*01*
U.S. Cl. D10—21

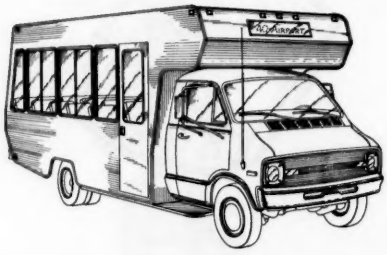


237,697
TOY TRACTOR
Keith E. Brightbill, Nashville, Tenn., assignor to The Murray Ohio Manufacturing Company, Brentwood, Tenn.
Filed Nov. 13, 1973, Ser. No. 415,390
Term of patent 14 years
Int. Cl. D12—*11*
U.S. Cl. D12—113

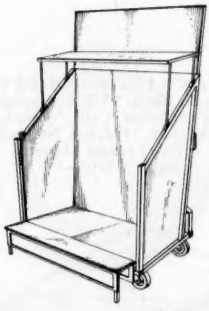


237,698
BUS
John J. Brennan, Kalamazoo, and Thomas J. Clark, Constantine, Mich., assignors to Apeco Corporation, Evanston, Ill.
Filed Mar. 11, 1974, Ser. No. 449,607
Term of patent 14 years
Int. Cl. D12—*08*
U.S. Cl. D12—84

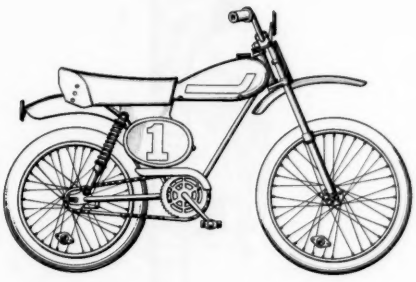
237,699
BUS
John J. Brennan, Kalamazoo, and Thomas J. Clark, Constantine, Mich., assignors to Apeco Corporation, Evanston, Ill.
Filed Mar. 11, 1974, Ser. No. 449,608
Term of patent 14 years
Int. Cl. D12—*08*
U.S. Cl. D12—84



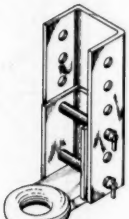
237,700
PORTABLE DISPLAY CART
Richard Allen Clarke, Greenwich, and William James Chvala and Raymond Edward De Witte, Danbury, Conn., assignors to PepsiCo, Inc., Purchase, N.Y.
Filed Aug. 8, 1974, Ser. No. 495,918
Term of patent 14 years
Int. Cl. D12—*02*
U.S. Cl. D12—30



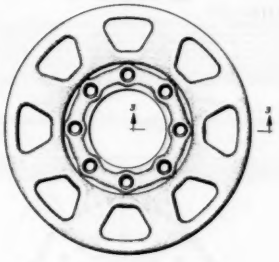
237,701
BICYCLE
Roy R. Vachon, Rolling Hills, Calif., assignor to W. R. Grace & Co., New York, N.Y.
Continuation-in-part of abandoned design application Ser. No. 527,471, Nov. 26, 1974. This application Dec. 23, 1974, Ser. No. 535,766
Term of patent 14 years
Int. Cl. D12—*11*
U.S. Cl. D12—111



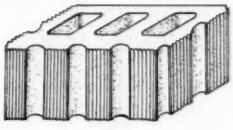
237,702
TRAILER HITCH
Norman C. Brown, 111 Bruning Ave., Rio Vista, Calif. 95671; Norman R. Brown, 1017 Charleston Circle, Roseville, Calif. 95678; and Charles W. Brown, 1031 Johnfer Way, Sacramento, Calif. 95831
Filed Feb. 10, 1975, Ser. No. 548,345
Term of patent 14 years
Int. Cl. D12—*16*
U.S. Cl. D12—162



237,703
WHEEL CENTER
Richard Harold Clement and Donald Gene Melbinger, La Grange, Ill., assignors to Clement Wheel Company, Inc., Chicago, Ill.
Filed Mar. 3, 1975, Ser. No. 554,729
Term of patent 14 years
Int. Cl. D12—*16*
U.S. Cl. D12—211

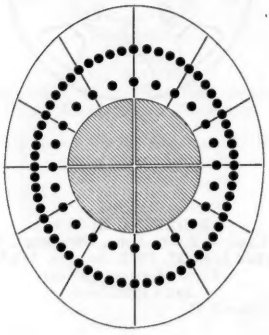


237,704
BUILDING BLOCK
John G. Lane, 4 Perity Lane, Pittsburgh, Pa. 15220
Filed Mar. 27, 1972, Ser. No. 238,758
Term of patent 14 years
Int. Cl. D25—*01*
U.S. Cl. D18—2 R



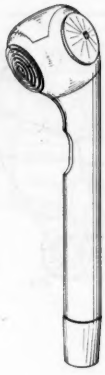
237,705
LETTERING AND WRITING PEN
Charles Roger Anderson, 20 East St., Proctor, Vt. 05765
Filed Feb. 8, 1973, Ser. No. 330,611
Term of patent 14 years
Int. Cl. D19—*06*
U.S. Cl. D19—45

237,706
CLOCK FACE
Ronald Reginald Burgess, Phoenix, Michael Garm Coleman, Tempe, Lawrence Ames Grenon, Phoenix, and Israel Arnold Lesk, Scottsdale, Ariz., assignors to Motorola, Inc., Chicago, Ill.
Continuation-in-part of abandoned design applications Ser. No. 120,382, Ser. No. 120,383, and Ser. No. 120,384, all Mar. 2, 1971. This application Jan. 22, 1973, Ser. No. 325,384
Term of patent 14 years
Int. Cl. D10—*07*
U.S. Cl. D10—123

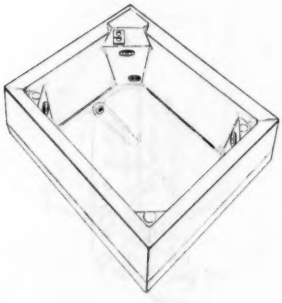


237,707
FISHING LURE HEAD
Frank V. Koczorowski, 534 E. Park St., Toledo, Ohio 43608
Filed July 29, 1974, Ser. No. 492,772
Term of patent 14 years
Int. Cl. D22—*05*
U.S. Cl. D22—28

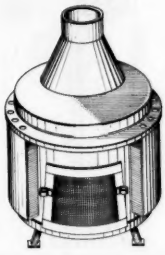
237,708
HAND SHOWER
Klaus Grohe, Schiltach, Germany, assignor to Firma Hans Grohe KG.
Filed Apr. 10, 1974, Ser. No. 459,576
Claims priority, application Germany Nov. 22, 1973
Term of patent 7 years
Int. Cl. D23—*01*
U.S. Cl. D23—35



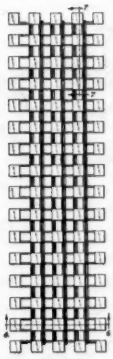
237,709
HYDROMASSAGE TUB
Roy A. Jacuzzi, 3793 Via Granada, Moraga, Calif. 94556, and Peter L. Kosta, 1035 Upper Happy Valley Road, Lafayette, Calif. 94549
Filed Nov. 28, 1973, Ser. No. 419,814
Term of patent 14 years
Int. Cl. D23—*02*
U.S. Cl. D23—55



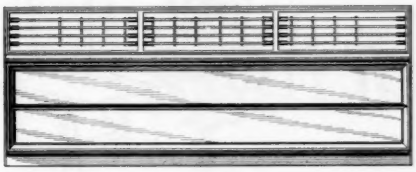
237,710
**FREE-STANDING STOVE**
Egbert Howland and Kurt R. Howland, Maryland, N.Y. (both % American Spinning & Metal Products, Shelter Rock Road, Danbury, Conn. 06810)
Filed Oct. 17, 1974, Ser. No. 515,508
Term of patent 14 years
Int. Cl. D23—*03*
U.S. Cl. D23—97



237,711
**GRATING FOR USE IN VENTILATION SYSTEMS**
Leif Johansson, Jonkoping, Sweden, assignor to Aktiebolaget Svenska Flaktfabriken, Nacka, Sweden
Filed Sept. 19, 1974, Ser. No. 507,349
Term of patent 14 years
Int. Cl. D23—*04*
U.S. Cl. D23—112



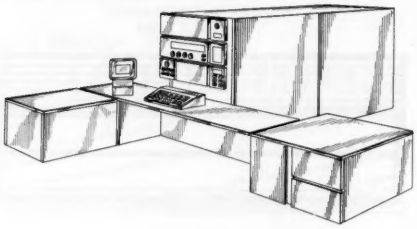
237,712
**LOW PROFILE AIR CONDITIONER FOR MOUNTING IN DOUBLE-HUNG WINDOWS**
James W. Bruner, Sr., and George W. Sisk, Jr., Evansville, Ind., assignors to Whirlpool Corporation, Benton Harbor, Mich.
Filed June 5, 1972, Ser. No. 260,044
Term of patent 14 years
Int. Cl. D23—*04*
U.S. Cl. D23—141



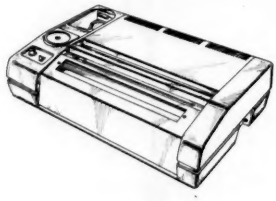
237,713
**DENTAL WATER GUN**
Corless W. Wiley, 1505 Junior Drive, Dallas, Tex. 75208
Filed Apr. 17, 1974, Ser. No. 461,541
Term of patent 14 years
Int. Cl. D24—*02*
U.S. Cl. D24—1 D

237,714
**DENTAL FLOSS HOLDER**
Dona B. Recchia and Peter L. Recchia, Los Angeles, Calif. (both of 19121 Clymer St., Northridge, Calif. 91324)
Filed Dec. 10, 1973, Ser. No. 423,439
Term of patent 14 years
Int. Cl. D24—*99*
U.S. Cl. D24—1 D

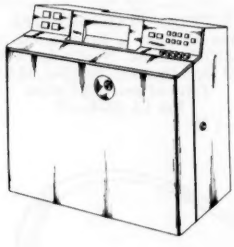
237,715
COMPUTER SYSTEM
Dennis P. Butterbaugh and Arthur C. Hanft, Rochester, Minn., assignors to International Business Machines Corporation, Armonk, N.Y.
Filed Jan. 21, 1974, Ser. No. 435,141
Term of patent 14 years
Int. Cl. D14—*02*
U.S. Cl. D26—5 C



237,716
FACSIMILE TRANSCEIVER
Tadashi Itoh and Ryunosuke Nakano, Yokohama-shi, and Seizou Suzuki, Ebina-shi, Japan, assignors to Matsushita Graphic Communication Systems, Inc., Tokyo, Japan
Filed Jan. 4, 1973, Ser. No. 321,075
Claims priority, application Japan July 5, 1972
Term of patent 14 years
Int. Cl. D14—*02*
U.S. Cl. D26—5 C

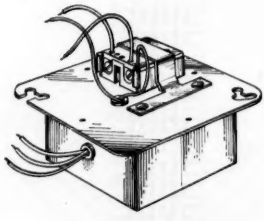


237,717
DATA COMMUNICATIONS TERMINAL AND INSPECTOR'S STATION
Walter W. Wiebe, 1915 Alexander Road, Raleigh, N.C. 27608
Filed Apr. 25, 1974, Ser. No. 464,267
Term of patent 14 years
Int. Cl. D14—*02*
U.S. Cl. D26—5 C



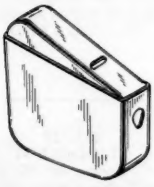
237,718
HOUSING FOR EXTERIOR ELECTRICAL RECEPTACLES
Robert A. Bozich, Eveleth, Minn., assignor to Malton Electric Company, Virginia, Minn.
Filed Dec. 9, 1974, Ser. No. 530,692
Term of patent 14 years
Int. Cl. D13—*03*
U.S. Cl. D26—12

237,719
POWER CONTROL WIRING DEVICE ADAPTED FOR MOUNTING IN A CONDUIT BOX
Donald Charles Long, Yardley, Pa., and Albert Charles Hartsough, Willingboro, and Robert Fincher Sanford, Titusville, N.J., assignors to Princeton Electro Dynamics, Inc.
Filed Oct. 3, 1973, Ser. No. 402,965
Term of patent 14 years
Int. Cl. D13—*03*
U.S. Cl. D26—13 R

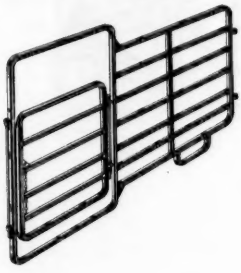


237,720
**TELEPHONE SET**
Shigeo Kusaka, Masami Umezawa, and Takayuki Shikamata, Tokyo, Japan, assignors to Tamura Electric Works, Ltd., Tokyo, Japan
Filed Feb. 25, 1974, Ser. No. 445,100
Term of patent 14 years
Int. Cl. D14—*03*
U.S. Cl. D26—14 A

237,721
**LIGHTER**
Peter Steer Sampson, London, England, assignor to Ronson Corporation, Woodbridge, N.Y.
Filed Apr. 28, 1972, Ser. No. 248,797
Term of patent 14 years
Int. Cl. D27—*05*
U.S. Cl. D27—42

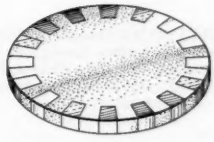


237,722
**GATE**
Frank Kratky, Bellvue, Colo., assignor to Westguard Products, Inc., Fort Collins, Colo.
Filed Mar. 18, 1974, Ser. No. 451,792
Term of patent 14 years
Int. Cl. D25—*02*
U.S. Cl. D28—1 B

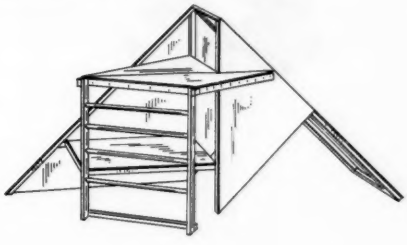


237,723
**CROSS WITH ROTATABLE RING**
Sam S. Sweet, 1295 W. Miracle Mile 85705, and Josephine M. Conte, 1030 E. Blanton Drive 85719, both of Tucson, Ariz.
Filed Jan. 2, 1974, Ser. No. 429,963
Term of patent 14 years
Int. Cl. D11—*02*
U.S. Cl. D29—23 A

237,724
**GAME CHIP**
Joseph H. Garaventa, Reno, Nev., assignor to Harrah's Club, Reno, Nev.
Filed Oct. 24, 1972, Ser. No. 300,245
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—5 PC



237,725
**PLAY SLIDE**
Frederic Gregg Loeser, 160 E. Rock Road, New Haven, Conn. 06511
Filed Apr. 6, 1973, Ser. No. 348,469
Term of patent 14 years
Int. Cl. D21—*03*
U.S. Cl. D34—5 E

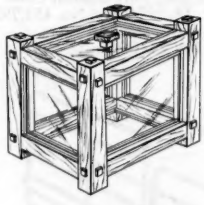


237,726
HANDLE FOR A BADMINTON RACKET
Tung Chen, 419 San-Fung Road, Hou-Li Hsiang, Taichung Hsien, Taiwan
Filed Sept. 4, 1973, Ser. No. 393,972
Term of patent 14 years
Int. Cl. D21—*02*
U.S. Cl. D34—5 ST

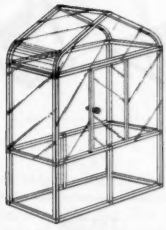
237,727
AMUSEMENT GAME TABLE
Robert Ralph Runte, Buffalo Grove, Ill., assignor to Fascination, Ltd., Des Plaines, Ill.
Filed July 29, 1974, Ser. No. 492,529
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—5 J

237,728
TOY BEAUTY SALON
Osamu Takahashi, Tokyo, Japan, assignor to Tomy Kogyo Co., Inc., Tokyo, Japan
Filed Aug. 27, 1974, Ser. No. 500,935
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—15 AC

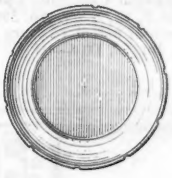
237,729
TERRARIUM
Ciro C. Coppa, 315 W. 6th St., San Pedro, Calif. 90731
Filed Oct. 11, 1974, Ser. No. 514,191
Term of patent 14 years
Int. Cl. D11—*02*; D30—*02*
U.S. Cl. D35—3 A



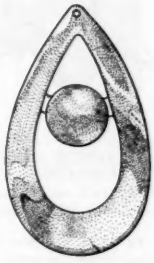
237,730
**WINDOW GREENHOUSE**
Borg Hansen, 1568 Ensley Ave., and John P. Myers, 422 Lomond Ave., both of West Los Angeles, Calif. 90024
Filed June 27, 1974, Ser. No. 483,772
Term of patent 14 years
Int. Cl. D25—*02, 03*
U.S. Cl. D35—3 R



237,731
**PLASTIC MOLDED FLOWER POT**
Theodor Box, 1108 Aileen Road, Brielle, N.J. 08730
Filed Dec. 17, 1974, Ser. No. 533,542
Term of patent 14 years
Int. Cl. D11—*02*
U.S. Cl. D35—3 A



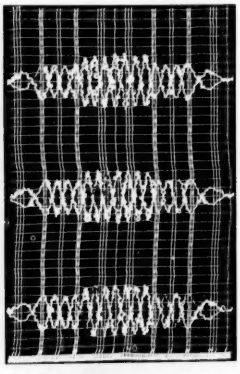
237,732
**PENDANT OR SIMILAR ARTICLE**
Margaretta C. Roberts, Providence, R.I., assignor to Reed and Barton Corporation, Taunton, Mass.
Filed May 23, 1974, Ser. No. 472,819
Term of patent 14 years
Int. Cl. D11—*01*
U.S. Cl. D45—16 A



237,733
**PENDANT OR SIMILAR ARTICLE**
Margaretta C. Roberts, Providence, R.I., assignor to Reed and Barton Corporation, Taunton, Mass.
Filed May 23, 1974, Ser. No. 472,831
Term of patent 14 years
Int. Cl. D11—*01*
U.S. Cl. D45—19 G

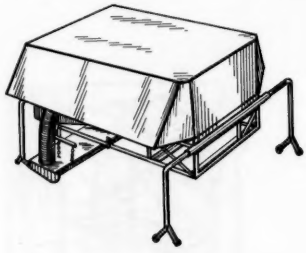
237,734
PENDANT OR SIMILAR ARTICLE
Margaretta C. Roberts, Providence, R.I., assignor to Reed and Barton Corporation, Taunton, Mass.
Filed May 23, 1974, Ser. No. 472,832
Term of patent 14 years
Int. Cl. D11—*01*
U.S. Cl. D45—19 L

237,735
CURTAIN
Peter Eric Schroeder, Oberwil, near Brenngarten, Switzerland, assignor to Gardisette Internationail AG, Lucerne, Switzerland
Filed May 10, 1974, Ser. No. 469,013
Claims priority, application Germany Nov. 15, 1973
Term of patent 14 years
Int. Cl. D5—*02*
U.S. Cl. D47—6 E

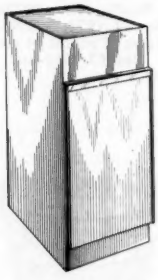


237,736
CANDLE HOLDER
Clark L. Lofgren, Raynham, Mass., assignor to Reed and Barton Corporation, Taunton, Mass.
Filed Feb. 19, 1974, Ser. No. 443,393
Term of patent 14 years
Int. Cl. D26—*01*
U.S. Cl. D48—2

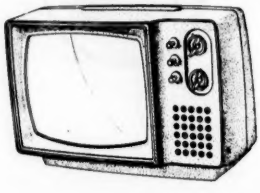
237,737
BED MOUNTED SWEEPER FOR A PICKUP TRUCK
Charles F. Reeves, 1200 S. Monaco Parkway, Denver, Colo. 80222
Filed Oct. 1, 1973, Ser. No. 402,366
Term of patent 14 years
Int. Cl. D12—*13*
U.S. Cl. D49—9.1



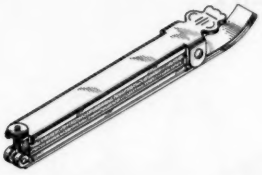
237,738
REFUSE COMPACTOR CABINET AND DRAWER STRUCTURE
Donald E. Necas, Stevensville, Mich., assignor to Whirlpool Corporation, Benton Harbor, Mich.
Filed Nov. 11, 1971, Ser. No. 167,071
Term of patent 14 years
Int. Cl. D23—*02*
U.S. Cl. D55—1 B



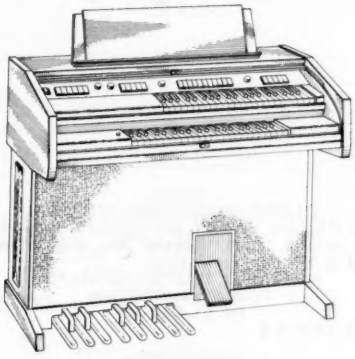
237,739
TELEVISION RECEIVER
Kenichi Itoh, Kawanishi, Tadahiko Tokuda, Osaka, and Kazuhiro Ueda, Takatsuki, Japan, assignors to Matsushita Electric Industrial Company, Ltd., Osaka, Japan
Filed Sept. 7, 1973, Ser. No. 396,274
Term of patent 14 years
Int. Cl. D14—*03*
U.S. Cl. D56—4 D



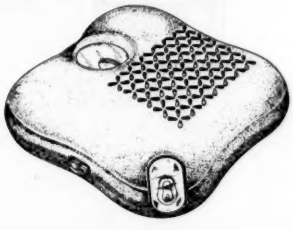
237,740
**MUTE FOR A FRETTED STRINGED MUSICAL INSTRUMENT**
Rolando Valdes Blain, 72 Barrow St., New York, N.Y. 10014
Filed Aug. 29, 1973, Ser. No. 392,540
Term of patent 14 years
Int. Cl. D17—*99*
U.S. Cl. D56—1 R



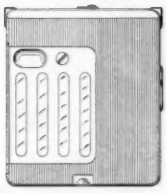
237,741
**ORGAN**
Thomas E. Kimble, Covington, Ky., assignor to D. H. Baldwin Company, Cincinnati, Ohio
Filed Apr. 30, 1974, Ser. No. 465,519
Term of patent 14 years
Int. Cl. D17—*01*
U.S. Cl. D56—2



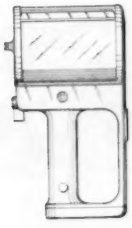
237,742
**COMBINED RADIO RECEIVER AND FLASHLIGHT**
Masaaki Miyamoto, Moriguchi, Japan, assignor to Matsushita Electric Industrial Co., Ltd.
Filed Oct. 31, 1973, Ser. No. 411,407
Claims priority, application Japan June 1, 1973
Term of patent 14 years
Int. Cl. D14—*03*
U.S. Cl. D56—4 B



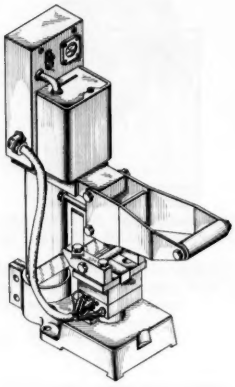
237,743
**POWER PACK FOR PHOTOGRAPHIC EQUIPMENT**
Robert Oberheim, Neu-Isenburg, Germany, assignor to Braun Aktiengesellschaft, Kronberg, Taunus, Germany
Original design application Dec. 28, 1973, Ser. No. 429,135. Divided and this application Feb. 18, 1975, Ser. No. 550,712
Claims priority, application Germany July 23, 1973
Term of patent 14 years
Int. Cl. D16—*05*
U.S. Cl. D61—1 F



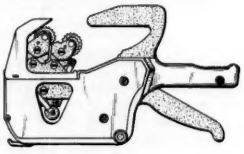
237,744
**PHOTOGRAPHIC STROBE LIGHT OR SIMILAR ARTICLE**
Robert Oberheim, Neu-Isenburg, Germany, assignor to Braun Aktiengesellschaft, Kronberg, Taunus, Germany
Original design application Dec. 28, 1973, Ser. No. 429,135. Divided and this application Feb. 18, 1975, Ser. No. 550,713
Claims priority, application Germany July 23, 1973
Term of patent 14 years
Int. Cl. D16—*05*
U.S. Cl. D61—1 F



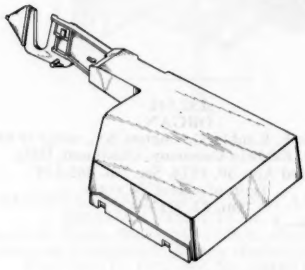
237,745
**MANUALLY OPERATED PRESS FOR HEAT SEALING ARTICLES**
Joseph E. Pierce, Allentown, Pa., assignor to Compacting Press Corporation, Bethlehem, Pa.
Filed Oct. 7, 1974, Ser. No. 512,700
Term of patent 14 years
Int. Cl. D15—*99*
U.S. Cl. D63—1



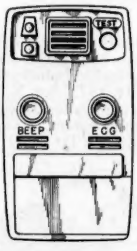
237,746
**PORTABLE LABELLING MACHINE**
Yo Sato, Toyko-to, Japan, assignor to Kabushiki Kaisha Sato Kenkiyosho, Tokyo, Japan
Filed Nov. 28, 1973, Ser. No. 419,671
Term of patent 14 years
Int. Cl. D18—*99*
U.S. Cl. D64—10



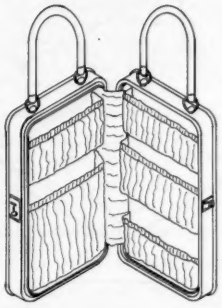
237,747
**RIBBON CARTRIDGE FOR BUSINESS MACHINES**
Ellen V. B. Ludwick, Syracuse, Aaron C. Zeamer, Cortland, and James E. Harmon, Groton, N.Y., assignors to SCM Corporation, New York, N.Y.
Continuation of design application Ser. No. 323,495, Sept. 15, 1973. This application Oct. 10, 1974, Ser. No. 513,912
Term of patent 14 years
Int. Cl. D18—*01*
U.S. Cl. D64—11 A



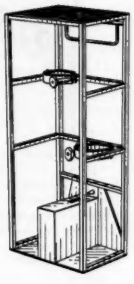
237,748
**HEART MONITORING DEVICE**
Stanley J. Sarnoff, Bethesda, and Herbert E. Reinhold, Jr., and Allan M. Wolfe, Rockville, Md., assignors to Survival Technology Incorporated
Filed Oct. 31, 1973, Ser. No. 411,457
Term of patent 14 years
Int. Cl. D24—*01*
U.S. Cl. D83—1 F



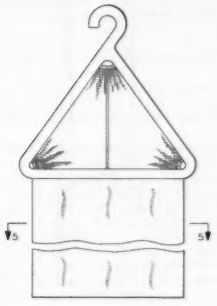
237,749
**TRAVEL CASE OR THE LIKE**
Harriet P. McGrath, 1617 Alameda Ave., Alameda, Calif. 94501
Filed Oct. 12, 1972, Ser. No. 299,879
Term of patent 7 years
Int. Cl. D3—*01*
U.S. Cl. D87—5 G



237,750
**PORTABLE CARRIER FOR GAS CYLINDERS**
Albert C. Martin, Carlton, Kans. 67429
Filed Dec. 14, 1973, Ser. No. 424,721
Term of patent 14 years
Int. Cl. D3—*02*
U.S. Cl. D87—1 R



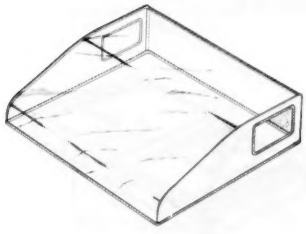
237,751
**LAUNDRY BAG**
Michael C. Wilson and Leslie E. Schnick, Wheaton, Ill., assignors to Pretty Products, Inc., Coshocton, Ohio
Filed Jan. 15, 1974, Ser. No. 433,553
Term of patent 14 years
Int. Cl. D3—*02*
U.S. Cl. D87—1



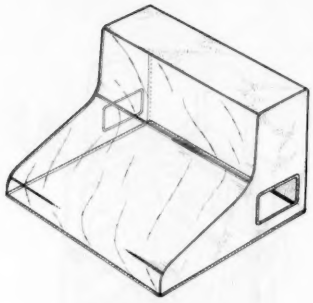
237,752
**TRAVELING CASE FOR GARMENTS**
Frederick K. Bauer, P.O. Box 1705, Beverly Hills, Calif. 90213
Filed May 13, 1974, Ser. No. 469,222
Term of patent 14 years
Int. Cl. D3—*02*
U.S. Cl. D87—1 R

237,753
LIVE-BAIT PACK
Andrew O. Lightfoot, 2848 Bonnywood, Dallas, Tex. 75233
Filed June 3, 1974, Ser. No. 475,527
Term of patent 14 years
Int. Cl. D3—*02*
U.S. Cl. D87—1 R

237,754
PROTECTIVE COVER FOR AN ELECTRONIC DATA TERMINAL
Joseph B. Ray, Jr., Atlanta, Ga.
(4405 Mall Blvd., Suite 501, Union City, Ga. 30291)
Filed June 10, 1974, Ser. No. 477,819
Term of patent 7 years
Int. Cl. D3—*02*
U.S. Cl. D87—1 R



237,755
PROTECTIVE COVER FOR AN ELECTRONIC DATA TERMINAL
Joseph B. Ray, Jr., Atlanta, Ga.
(4405 Mall Blvd., Suite 501, Union City, Ga. 30291)
Filed June 10, 1974, Ser. No. 477,820
Term of patent 7 years
Int. Cl. D3—*02*
U.S. Cl. D87—1 R



237,756
STREET ADDRESS DISPLAY SIGN
Richard J. Williamson, 218 Northhill Drive, San Antonio, Tex. 78201
Filed May 18, 1972, Ser. No. 254,835
Term of patent 14 years
Int. Cl. D20—*03*
U.S. Cl. D96—12 F

# LIST OF PATENTEES

## TO WHOM

## PATENTS WERE ISSUED ON THE 18TH DAY OF NOVEMBER, 1975

NOTE.—Arranged in accordance with the first significant character or word of the name (in accordance with city and telephone directory practice).

**A L & W Sports:** *See—*
Parsons, Ronald William, 3,920,167.

**AB Kabi:** *See—*
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**Abdurashidov, Gafur Abdushukurovich:** *See—*
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**Abe, Hideki:** *See—*
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**Abe, Mitsunobu:** *See—*
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**Abe, Nobuhiro:** *See—*
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**Abe, Yoshitaka:** *See—*
Sato, Hiroshi; Takahashi, Koji; Shigeta, Sadaaki; and Abe, Yoshitaka, 3,920,605.

**Abele, Thomas G., to Tait Inc.** Submersible aerator. 3,920,779, Cl. 261-87.000.

**Abrams, Richard L.; and Nussmeier, Thomas A., to Hughes Aircraft Company.** Frequency stabilized laser. 3,921,099, Cl. 331-94.5OS.

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**Ackerman, Don; and Schwartztol, Robert Ira, to PerCare, Inc.** Decorative placemat construction with a graphic pattern insert. 3,920,870, Cl. 428-46.000.

**Acousa Saxon S.A., Firma:** *See—*
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**Acra-Plant, Inc.:** *See—*
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**Adachi, Akiyoshi:** *See—*
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**Adama, Robert A. Q.; and van der Beek, Marten H. B., to Stamicarbon, N.V.** Process for the preparation of polyamide foam plastics. 3,920,593, Cl. 260-2.50N.

**Adamaitis, Richard C.** Flag pole holder. 3,920,207, Cl. 248-42.000.

**Adar, Inc.:** *See—*
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**Addressograph-Multigraph Corporation:** *See—*
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**Aebi, Peter:** *See—*
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**Aepli, Otto T.; Sorgenfrei, Malachy E.; and Curtis, Daniel B., to BASF Wyandotte Corporation.** Chemical peeling of edible plant products. 3,920,856, Cl. 426-287.000.

**Aerail Societe D'Etudes et de Representations, Industrielles Mecaniques et Metallurgiques S.E.R.I.M.M.:** *See—*
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**Afanasiev, Nikolai Gavrilovich; Zaitsev, Valery Leonidovich; and Kruglov, Vladimir Petrovich.** Photocolorimetric gas analyzer. 3,920,402, Cl. 23-254.00E.

**AG International:** *See—*
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**Agence Nationale de Valorisation de la Recherche (ANVAR):** *See—*
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**Agency of Industrial Science & Technology:** *See—*
Akami, Hitoshi; Nakazima, Masaya; and Katsumata, Masayoshi, 3,920,053.
Yajima, Hiroyoshi, 3,920,314.

**Agfa-Gevaert:** *See—*
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**AGFA-Gevaert Aktiengesellschaft:** *See—*
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**Aguet, Emile, to Sulzer Brothers Ltd.** Combustion gas turbine/steam generator plant. 3,919,839, Cl. 60-39.18B.

**Ahlstrand, Bengt, administratrix:** *See—*
Thorsman, Oswald Willy, deceased; Thorsman, Morg, administratrix; and Ahlstrand, Bengt, administratrix, 3,919,917.

**Ahmed, Adel Abdel Aziz, to RCA Corporation.** Biasing current attenuator. 3,921,013, Cl. 307-296.000.

**Ahramjian, Leo, to Du Pont de Nemours, E. I., and Company.** Adhesive compositions. 3,920,600, Cl. 260-29.7UA.

**Aihara, Ryuzo; Ota, Susumu; and Kobayashi, Nobuyuki, to Nihon Denshi Kabushiki Kaisha.** Breakdown protection for field emission electron gun. 3,921,078, Cl. 328-10.000.

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**Akami, Hitoshi; Nakazima, Masaya; and Katsumata, Masayoshi, to Agency of Industrial Science & Technology; and Kayabakogyokabushikikaisha.** Device for use with jacquard machine for selectively lifting warp yarns. 3,920,053, Cl. 139-319.000.

**Akiyama, Toyomi; Higaki, Taiji; Shiratsuchi, Eiichiro; Ishibashi, Yoshiyuki; and Tagami, Eijiro, to Japan Synthetic Rubber Co., Ltd.; and Kanzaki Paper Manufacturing Co., Ltd.** Electrostatic recording material. 3,920,880, Cl. 428-500.000.

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**Alabaster, Leonard Frederick Peter, to Conder International Limited.** Building construction. 3,919,815, Cl. 52-97.000.

**Alaburda, Raymond Daniel, to Du Pont de Nemours, E. I., and Company.** Compact battery. 3,920,477, Cl. 136-108.000.

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**Albert, Robert Eyer; and Weed, Grant Barg, to Du Pont de Nemours, E. I., and Company.** Water-dispersible pesticide aggregates. 3,920,442, Cl. 71-92.000.

**Albert, Walter; Schiedrum, Hans-Otto; and Tacheci, Heinrich, to Hoechst Aktiengesellschaft.** Process for the manufacture of shaped bodies from cellular thermoplastic materials. 3,920,876, Cl. 428-295.000.

**Alexander, John Bert, to Illinois Tool Works Inc.** Drive rivet assembly. 3,919,916, Cl. 85-68.000.

**Alig, Leo; Furst, Andor; Keller, Peter; Muller, Marcel; Kerb, Ulrich; and Wiechert, Rudolf, to Hoffmann-La Roche Inc.** D-Homosteroid lactones. 3,920,703, Cl. 260-343.600.

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**Allen, Francis Edwin; and Porter, Andrew Wilkinson, to Letson and Burpee Ltd.** Automatic roll tensioning method and apparatus. 3,919,900, Cl. 76-27.000.

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**Amano, Hiroshi:** *See—*
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**Amchem Products, Inc.:** *See—*
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Anbar, Michael; and Moseley, John T., to Stanford Research Institute. Method and system for detecting explosives. 3,920,987, Cl. 250-282.000.

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Anderson, Bruce M., to Sperry Rand Corporation. Character generator for a high resolution dot matrix display. 3,921,164, Cl. 340-324.0AD.

Anderson, Carl C.; Christenson, Roger M.; and Wiegmann, Egon Fritz, to PPG Industries, Inc. High solids alkyd coating compositions. 3,920,595, Cl. 260-22.0CQ.

Anderson, Franklin T., to Co-Operative Industries, Inc. Self-locking connector. 3,920,269, Cl. 285-84.000.

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Anderson, Lars-Olov; Borg, Hakan Gunnar; Forsman, Nanna; Hanshoff, Gunnar; Lindroos, Goran; Miller-Andersson, Maggie; and Ehrenberg, Elisabeth Charlotte, to AB Kabi. Isolation of coagulation factors from biological material using cross linked sulfated, sulfonated carbohydrates. 3,920,625, Cl. 260-112.00B.

Anderson, Quinn Shumway. Fire detectors. 3,921,158, Cl. 340-237.00R.

Anderson, Richard N., to V. E. Anderson Mfg. Co. Miter joint structure. 3,920,344, Cl. 403-401.000.

Andersson, John: *See*—
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Andrasev, Ivan; and Nemeth, Jozsef, to Novex RT. Process and apparatus for producing a neck on a metal container having a closed bottom. 3,919,871, Cl. 72-55.000.

Andreeva, Elena Ivanovna: *See*—
Golyshin, Nikolai Mikhailovich; Andreeva, Elena Ivanovna; Dvoichenkova, Elza Alexandrovna; Ukrainets, Nina Sergeevna; Skazkina, Tatyana Pavlovna; Solovieva, Galina Viktorovna; Bodrova, Margarita Romanovna; Rotastikova, Nina Alexandrovna; Melnikov, Nikolai Nikolaevich; Kukalenko, Stepan Sofronovich; Nuridzhanian, Karen Armenakovich; Nesterova, Lilia Mikhailovna; Usmanov, Marat Tashpulatovich; Novikova, Raisa Grigorievna; Kuznetsova, Galina Vladimirovna; Volodkovich, Stepan Dmitrievich; Burmakin, Nikolai Mikhailovich; Obukhova, Valentina Ivanovna; Monova, Violetta Ivanovna; Shkuratova, Galina Nikonovna; Sanin, Mikhail Arsenievich; Kulagina, Natalya Nikolaevna; and Mironova, Nina Evgenievna, 3,920,680.

Angel Engineering Corporation: *See*—
Angel, Henry Robert; and Hennessy, James William, 3,921,066.

Angel, Henry Robert; and Hennessy, James William, to Angel Engineering Corporation. Blood test device and method. 3,921,066, Cl. 324-71.0CP.

Ansell, George S.; Judd, Gary; and Grove, Carl A., to United States of America, Navy. Thin insulating film containing metallic particles. 3,920,485, Cl. 148-6.300.

Anselmi, Robert T.: *See*—
Williams, Laurence O.; and Anselmi, Robert T., 3,921,002.

Antonini, Eraldo: *See*—
Molteni, Luigi; Antonini, Eraldo; and Oradi, Emilio, 3,920,631.

Anzai, Nobuo; and Kamaike, Hiroshi, to Mitsubishi Denki Kabushiki Kaisha. Elevator speed control apparatus. 3,921,046, Cl. 318-203.00R.

Apparatebau Rothemuhle Brandt & Kritzler: *See*—
Kirchhoff, Franz Josef, 3,920,066.

Applied Materials, Inc.: *See*—
Schatz, Douglas S., 3,921,092.

Arai, Kunio: *See*—
Takahashi, Chiyomaru; Kaneko, Tadao; Sakabe, Akira; Sakagami, Mitsuhiro; and Arai, Kunio, 3,920,946.

Araiba, Kiyotomo: *See*—
Takaoka, Ichiro; Fukuda, Michio; Kisaki, Takuro; Kitano, Hiroshi; Koiwai, Akira; Shinohara, Toshikiyo; Araiba, Kiyotomo; Kitamura, Toshiaki; and Yamamoto, Yoshitada, 3,920,440.

Araki, Kazuhiko: *See*—
Nakanishi, Michio; Tahara, Tetsuya; Araki, Kazuhiko; and Shiroki, Masami, 3,920,679.

Archer, Donald H.: *See*—
Shanafelt, Robert E.; Hilton, Richard F.; and Archer, Donald H., 3,921,176.

Argabright, Perry A.; Echelberger, Larry M.; and Phillips, Brian L., to Marathon Oil Company. Ion exchange of metals from aqueous solutions. 3,920,545, Cl. 210-30.000.

Argoudelis, Alexander D.; Coats, John H.; and Sebek, Oldrich K., to UpJohn Company, The. Composition of matter and process. 3,920,522, Cl. 195-80.00R.

Arifov, Ubai Arifovich; Kharmats, Dmitry Efimovich; Abdurashidov, Gafur Abdushukurovich; Leontiev, Gennady Andreevich; Zhegallo, Jury Vladimirovich; Parilis, Eduard Simkhovich; Vzenkonsky, Alexandr Vasilievich; Sapon, Anatoly Dmitrievich; Lavnikanis, Vladimir Fedorovich; Kogan, Mark Iosifovich; Egorov, Nikolai Petrovich; and Shaidullin, Abuzar Gabdurakhmanovich. Cotton seed delinting machine. 3,919,742, Cl. 19-41.000.

Ariyoshi, Yasuo; Yasuda, Naohiko; and Yamatani, Tetsuo, to Ajinomoto Co., Inc. Novel aspartyl dipeptide esters as sweeteners. 3,920,626, Cl. 260-112.500.

Ark-Les Switch Corporation: *See*—
Walsh, Richard S.; and Weber, Donald R., 3,920,310.

Arman, Dario. Means for engagement between the ends. 3,919,735, Cl. 15-250.320.

Armstrong Cork Company: *See*—
Ollinger, James C., 3,920,872.

Armstrong, Donald J.; and Hitzelberger, Alan L., to General Motors Corporation. Combustion control. 3,919,838, Cl. 60-39.270.

Arnaud, Henri; and Hergovalch, Jean Rene, to Regie Nationale des Usines Renault. Multifunction control valve. 3,919,843, Cl. 60-290.000.

Arthur D. Little, Inc.: *See*—
La Mantia, Charles R.; and Stevens, James I., 3,920,794.

Artzer, Charles W.: *See*—
Rawlins, Wendell G.; Hoffsommer, Gary M.; Artzer, Charles W.; and Parrett, Cecil H., 3,921,065.

Asahara, Yoshiyuki; Izumitani, Tetsuro; and Tajima, Hidemi, to Hoya Glass Works, Ltd. Glass material having a switching effect. 3,920,461, Cl. 106-47.00R.

Asahi Glass Company, Ltd.: *See*—
Kirimoto, Kazusuke; and Hayashi, Takao, 3,920,614.

Asahi Kasei Kogyo Kabushiki Kaisha: *See*—
Shiki, Takehiko; Harada, Ikuo; Harada, Tadamasa; and Shiga, Masaaki, 3,920,575.

Asahi Kogaku Kogyo Kabushiki Kaisha: *See*—
Mori, Chiharu; and Kawasaki, Masahiro, 3,921,064.

Asai, Komei: *See*—
Fukai, Masakazu; Nagata, Seiichi; Asai, Komei; and Hattori, Katsuji, 3,921,162.

Asami, Etsuji, to Matsushita Electric Industrial Co., Ltd. Magnetic recording and reproducing system with tape counter. 3,921,215, Cl. 360-74.000.

Ascani, Leonard A., Jr.: *See*—
Hamilton, Charles Howard; and Ascani, Leonard A., Jr., 3,920,175.

Ash, Arthur Edward Michael; and Roope, Jesse William Thomas. Detecting small potential differences in a mammalian body. 3,920,003, Cl. 128-2.10Z.

Ashworth Bros., Inc.: *See*—
Roinestad, Gerald C., 3,920,117.

Askew, Anthony B.: *See*—
McIntosh, Robert H.; and Hull, Ezekiel H., 3,920,836.

Associated Pulp and Paper Mills Limited: *See*—
Morgan, John Edward, 3,920,506.

Atherton, Harry D.; Edwards, Neil K.; and Perlstein, Paul H. Temperature controller for incubators. 3,920,000, Cl. 128-1.00B.

Atlantic Richfield Company: *See*—
Jubin, John C., Jr.; and Grane, Henry R., 3,920,766.
Kern, Loyd R., 3,920,072.
Roe, Glenn D., 3,920,151.
Yoo, Jin Sun; and Milam, Ronald L., 3,920,763.

Atlas Powder Company: *See*—
Janoski, Florian B., 3,921,071.

Atwater, Franklin S.; Van Dorn, Horace B.; and Swanson, Sven V., to Textron Inc. Locking device for a bearing ring of the like. 3,920,341, Cl. 403-352.000.

Audi NSU Auto Union Aktiengesellschaft: *See*—
Wieland, Werner, 3,920,358.

Aufderhaar, Ernst: *See—*
Kristinsson, Haukur; Hubele, Adolf; and Aufderhaar, Ernst, 3,920,669.

Augart, Dietmar; Mach, Wolfgang; and Scheuermann, Horst, to BASF Aktiengesellschaft. N-substituted iminocoumarin dyes. 3,920,704, Cl. 260-345.200.

August Kolbus: *See—*
Lubeck, Hermann, 3,919,971.

Austin, Walter H., Jr.; Busuttil, John J.; and Rinaldi, Anthony J., to United States of America, Army. Grenade launcher and annular cartridge therefor. 3,919,799, Cl. 42-1.00F.

Auto-Craft Tool & Die Company: *See—*
DuVernay, Arthur C., 3,919,955.

Automatic Close & Lock Corporation: *See—*
Ratner, George Irving, 3,921,160.

Automatic Switch Company: *See—*
Ringstad, Ralph H.; and Daley, James M., 3,921,070.

Automation Development and Engineering Corporation: *See—*
Warning, Walter B.; and Warning, Walter B., Jr., 3,919,967.

Autoquip Corporation: *See—*
Richards, Lawrence I., 3,920,101.

Auzins, Eric Egils: *See—*
Lenaerts, George Victor; and Auzins, Eric Egils, 3,920,926.

Avco Everett Research Laboratory, Inc.: *See—*
Caristi, Robert F.; Leonard, Donald A.; and Itzkan, Irving, 3,921,097.
Hoag, Ethan D., 3,921,098.

Avellar, Karl B.; and Buchanan, James E., to Westinghouse Electric Corporation. Method and system for testing signal transmission paths. 3,920,973, Cl. 235-151.310.

Awano, Koichi: *See—*
Suzuki, Tosho; Awano, Koichi; and Katsuhisa, Ogino, 3,920,875.

Axen, Udo F., to Upjohn Company, The. $PGF_2$ Analogs. 3,920,726, Cl. 260-468.00D.

Ayerst, McKenna and Harrison Ltd.: *See—*
Bruderlein, Francois T.; and Humber, Leslie G., 3,920,820.

Ayres, Waldemar A., to Becton, Dickinson and Company. Serum/-plasma separator--beads-plus-adhesive type. 3,920,557, Cl. 210-516.000.

B. F. Goodrich Company, The: *See—*
Ely, William E., 3,920,108.
Kuts, Mathew, 3,919,904.

Babb, Howard R., Jr. Pipe coupling. 3,920,270, Cl. 285-104.000.

Bach, Nicholas J.: *See—*
Clemens, James A.; Kornfeld, Edmund C.; and Bach, Nicholas J., 3,920,664.

Backhaus, Horst; and Schroder, Heinz, to Nordischer Maschinebau Rud. Baader. Apparatus for beheading flatfish. 3,919,741, Cl. 17-63.000.

Backley, Donald A.: *See—*
Jacobs, Richard L.; Backley, Donald A.; Simpson, James V.; and Beck, Walter, 3,920,589.
Jacobs, Richard L.; Backley, Donald A.; Simpson, James V.; and Beck, Walter, 3,920,590.
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Badische Anilin- & Soda-Fabrik Aktiengesellschaft: *See—*
Fischer, Adolf, 3,920,441.
Rohr, Wolfgang; Franke, Albrecht; Giertz, Hubert; and Amann, August, 3,920,829.

Baer, Ralph H., to Sanders Associates, Inc. Preprogrammed television gaming system. 3,921,161, Cl. 340-324.0AD.

Baessler, Konrad; and Mayer, Kurt, to Hoechst Aktiengellschaft. Process of preparing aromatic amines. 3,920,743, Cl. 260-580.000.

Bailey, John J. Signal lamps. 3,920,981, Cl. 240-22.000.

Bailey, Paul T.: *See—*
Minnick, Robert C.; Bailey, Paul T.; and Sandfort, Robert M., 3,921,155.

Baird, William C. Safeguard sentry. 3,921,074, Cl. 325-303.000.

Baker, Don R., to Stauffer Chemical Company. Biocidal active carbamyl hydrazones. 3,920,437, Cl. 71-67.000.

Baker, Joseph R.; Busche, William W.; and Hindell, Sidney E., to Diagnostic Instruments, Inc. Ionographic film processor and associated method. 3,920,991, Cl. 250-315.000.

Baker, Roy V.: *See—*
Laird, Joseph W.; and Baker, Roy V., 3,920,542.

Baker, Thomas R., to Kliklok Corporation. Article transfer system with spatial adjustment. 3,920,128, Cl. 214-1.0BV.

Bakermans, Fransiscus Cornelius, to Du Pont de Nemours, E. I., and Company. Toggle press. 3,919,876, Cl. 72-451.000.

Bakker, Gijsbertus; and Gijrath, Johannes Henricus Nicolaas, to U.S. Philips Corporation. Color selection electrode mount with coating of ductile metal. 3,921,024, Cl. 313-404.000.

Balash, Lawrence J.: *See—*
Howell, John K., Jr.; and Balash, Lawrence J., 3,920,486.

Baldwin, John Lewis Edwin, to Independent Broadcasting Authority. Digital recording apparatus especially for television signals. 3,921,132, Cl. 340-146.1AG.

Ball Brothers Research Corporation: *See—*
Munson, Robert E., 3,921,177.

Baller, Albert H. Non-spilling device. 3,920,146, Cl. 220-90.400.

Ballman, Gray C. Battery chargers. 3,921,051, Cl. 320-39.000.

Ballou, David G., to Dayco Corporation. Endless power transmission belt structure. 3,919,892, Cl. 74-231.00P.

Ballu, Louis, to Pneumatiques, Caoutchouc Manufacture et plastiques Kleber-Colombes. Floating anti-pollution barrier. 3,919,847, Cl. 61-1.00F.

Ballweber, Edward G.: *See—*
Hurlock, John R.; Ballweber, Edward G.; and Connelly, Lawrence J., 3,920,599.

Banko, Anton. Surgical system for controlling the infusion of fluid to and the evacuation of fluid and material from an operating field. 3,920,014, Cl. 128-230.000.

Bar-Lev, Hillel. Automatic pattern recognition method and apparatus particularly for optically recognizing characters. 3,921,136, Cl. 340-146.30H.

Barber-Colman Company: *See—*
Fassell, W. Martin; and Bridges, Donald W., 3,920,548.

Barber, Robert C.; Bettacchi, Robert J.; Lundsager, C. Bent; and Wood, Louis L., to W. R. Grace & Co. Fully cured crosslinkable pressure sensitive adhesive materials and method of making same. 3,920,877, Cl. 428-345.000.

Barer, Sol J.; Stockel, Richard F.; and Vit, Jaroslav. N-chloro carbamates as insecticides and fungicides. 3,920,832, Cl. 424-300.000.

Barer, Sol J.; and Valenti, Peter C., to National Patent Development Corporation. Chlorinated diaromatic-substituted aminoalkanes as fungicides and insecticides. 3,920,844, Cl. 424-330.000.

Barker, Thomas G.; Young, Larry L.; and Endres, Joseph G., to Central Soya Company, Inc. Method of preparing a granular free-flowing lecithin product. 3,920,857, Cl. 426-307.000.

Barkley, John R., to Du Pont de Nemours, E. I., and Company. Electric polarization domain device and method. 3,921,154, Cl. 340-173.0MS.

Barnett, Miles Edmond, Jr.; Foster, George Hails, Jr.; and Patton, George Allen, to AMP Inc. Tap connections for multi-conductor cables. 3,920,306, Cl. 339-103.00M.

Barnfield, Curtis L.: *See—*
Martin, Daniel T.; Serrell, Morton A.; Coleman, Herbert C.; Cooper, Donald L.; Knox, Robert M.; Barnfield, Curtis L.; and Walinchus, Robert J., 3,920,967.

Barnstedt, Egge: *See—*
Berg, Gerhard; Nordsiek, Karl-Heinz; Sommer, Neithart; Barnstedt, Egge; and Cuntze, Gerhard, 3,920,604.

Barnum, Thomas G.; Hessler, Frank; and Larson, Robert A., to Bradley Corporation. Lever operated control valve. 3,920,216, Cl. 251-51.000.

Barowski, Gerhard: *See—*
Sandmann, Herbert; Dietze, Wolfgang; Rucha, Ulrich; and Barowski, Gerhard, 3,919,968.

Barr, Harold N., to Nuclear Battery Corporation. Electrical feedthrough assembly suitable for electronic devices implantable in a human body. 3,920,888, Cl. 174-152.0GM.

Barrett Electronics Corporation: *See—*
Fernstrom, Henry C., 3,920,105.

Barrie, Ronald E.: *See—*
Bigham, Carroll R.; and Barrie, Ronald E., 3,920,206.

Barrus, Gordon Brent; Emenaker, Leo Joseph; and Melissa, Raymond Franklin, to Pertec Corporation. High speed line printing apparatus. 3,919,936, Cl. 101-93.140.

Barry, Gerald E.: *See—*
Kanengieter, Glenn G.; and Barry, Gerald E., 3,920,190.

Bart, Philip D. Fishing equipment. 3,919,801, Cl. 43-17.000.

BASF Aktiengesellschaft: *See—*
Augart, Dietmar; Mach, Wolfgang; and Scheuermann, Horst, 3,920,704.
Ege, Guenter, 3,920,693.
Kindscher, Wolfgang; Beyer, Karl-Heinz; and Wulz, Klaus, 3,920,706.
Krome, Gerd, 3,920,761.
Okey, Bernard J., 3,921,203.
Petersen, Harro; Erhardt, Klaus; Ruemens, Wilhelm; and Bille, Heinz, 3,920,390.
Wiersdorff, Walter Wielant; and Fischer, Martin, 3,920,692.

BASF Wyandotte Corporation: *See—*
Aepli, Otto T.; Sorgenfrei, Malachy E.; and Curtis, Daniel B., 3,920,856.

Bass, Larry F., to Rockwell International Corporation. Data communications network remote test and control system. 3,920,975, Cl. 235-153.0AK.

Bastenhof, Dirk, to Societe D'Etudes de Machines Thermiques. Fuel injection pump. 3,919,990, Cl. 123-139.0AC.

Basuino, Antonio F. No step garbage can press. 3,919,932, Cl. 100-228.000.

Battles, Willis R. Pilotless glider construction. 3,920,201, Cl. 244-16.000.

Bauer, Brigitte: *See—*
Freller, Helmut; and Bauer, Brigitte, 3,920,860.

Bauer, Fritz. Non-leaking gas spring. 3,920,253, Cl. 277-187.000.

Baum, Thomas, to American Home Products Corporation. Method of treating antiarrhythmic activity with bis[2-(dialkylamino)ethoxy]xanthen-9-one antiarrhythmic agents. 3,920,826, Cl. 424-283.000.

Bauman, William C.: *See—*
Small, Hamish; and Bauman, William C., 3,920,397.

Baxmann, Fritz; Frese, Albert; Dietrich, Johann; and Hahmann, Otto, to Chemische Werke Huels, Aktiengesellschaft. Process for the production of high-molecular low-pressure co- and terpolymers of ethylene of low density. 3,920,621, Cl. 260-80.780.

Baxter, Gene F.: *See—*
Freeman, Harlan G.; Baxter, Gene F.; and Allan, George Graham, 3,920,613.

Bayer Aktiengesellschaft: *See—*
Beck, Gunther; Doring, Fritz; Holtschmidt, Hans; and Ley, Kurt, 3,920,649.
Beecken, Hermann, 3,920,720.
Buchel, Karl-Heinz; and Stendel, Wilhelm, 3,920,681.
Hohmann, Walter; Herzog, Helmut; and Bien, Hans-Samuel, 3,920,632.
Krock, Friedrich Wilhelm; and Neeff, Rutger, 3,920,702.
Lippert, Axel; Joisten, Siegfried; and Sajben, Johannes-Otto, 3,920,049.
Metzger, Carl; Jager, Gerhard; and Lurssen, Klaus, 3,920,727.
Meyer, Horst; Bossert, Friedrich; Vater, Wulf; and Stoepel, Kurt, 3,920,823.
Pampus, Gottfried; Oberkirch, Wolfgang; Gunther, Peter; and Schon, Nikolaus, 3,920,773.
Reiff, Helmut; Lienert, Jurgen; Nast, Roland; Witt, Harro; and Gupta, Pramod, 3,920,598.
Traubel, Harro; and Konig, Klaus, 3,920,588.
Wagner, Klaus; Eue, Ludwig; and Klauke, Erich, 3,920,445.
Wenzelburger, Jurgen; Jager, Gerhard; Eue, Ludwig; and Schmidt, Robert R., 3,920,653.
Widdig, Arno; Kuhle, Engelbert; Sasse, Klaus; Scheinpflug, Hans; Grewe, Ferdinand; Kaspers, Helmut; and Frohberger, Paul-Ernst, 3,920,831.

Baynes, Frederick; and Bowker, David Edward, to Dunlop Limited. Injection means. 3,920,393, Cl. 21-7.000.

BBC Brown Boveri & Company Limited: *See—*
Lecocq, Francois, 3,919,846.
Marek, Alois, 3,921,086.

Beasley, Robert E.; and Hannah, Robert W., to Rama Corporation. Resistance heater with improved thermocouple. 3,920,963, Cl. 219-523.000.

Becher, Wilfried; and Massonne, Joachim, to Kali-Chemie Aktiengesellschaft. Processes for producing concentrated aqueous solutions of fluoboric acid. 3,920,825, Cl. 423-276.000.

Beck, Gunther; Doring, Fritz; Holtschmidt, Hans; and Ley, Kurt, to Bayer Aktiengesellschaft. Process for the preparation of chloropyrimidines. 3,920,649, Cl. 260-251.00R.

Beck, Walter: *See—*
Jacobs, Richard L.; Backley, Donald A.; Simpson, James V.; and Beck, Walter, 3,920,589.
Jacobs, Richard L.; Backley, Donald A.; Simpson, James V.; and Beck, Walter, 3,920,590.
Jacobs, Richard L.; Backley, Donald A.; Simpson, James V.; and Beck, Walter, 3,920,591.

Beck, William D. Self-chilling container with safety device and method of making same. 3,919,856, Cl. 62-60.000.

Becker, John E.; and Schultz, Adolph E., to Whirlpool Corporation. Solder method. 3,920,176, Cl. 228-183.000.

Beckman Instruments, Inc.: *See—*
Carter, Alan W.; and Franklin, Robert C., 3,921,047.
Cederstrand, Carl N.; and Keegan, Jack J., 3,920,993.
Vitriol, William A., 3,920,584.

Becton, Dickinson and Company: *See—*
Ayres, Waldemar A., 3,920,557.

Beecham Group Limited: *See—*
Buckle, Derek Richard; and Smith, Harry, 3,920,725.
Smith, Harry; Buckle, Derek Richard; Spicer, Barbara Anne; and Wade, Esther Beatrice, 3,920,845.

Beecken, Hermann, to Bayer Aktiengesellschaft. Styryl dyestuffs. 3,920,720, Cl. 260-465.00E.

Beekman, Stewart M. Stable antacid compositions based on aluminum hydroxide and containing hydroxy magnesium aminoacetate and process for preparing the same. 3,920,792, Cl. 424-156.000.

Beery, Jack, to Burroughs Corporation. Power minimization for electrostrictive actuated printers. 3,919,934, Cl. 101-93.290.

Behnke, Joachim: *See—*
del Rio, Marija; Behnke, Joachim; Wallrabenstein, Michael; and Frank, Dieter, 3,920,611.

Beindorf, Lucian J. Building structure. 3,919,813, Cl. 52-80.000.

Belady, Laszlo A.; and Roth, Robert I., to International Business Machines Corporation. System and method for evaluating paging behavior. 3,921,153, Cl. 340-172.500.

Belkir, Marcel. Exerciser. 3,920,241, Cl. 272-83.00R.

Bell, Alan Brentford, to Hawker Siddeley Aviation Limited. Aircraft. 3,920,205, Cl. 244-118.00R.

Bell, Francis D., to Caterpillar Tractor Co. Idler recoil and track adjuster spring retention arrangement, and method of assembly and disassembly thereof. 3,920,286, Cl. 305-10.000.

Bell & Howell Company: *See—*
Linke, Walter R., 3,920,315.
Murre, Robert W.; and Bookless, George W., 3,920,332.

Bell, John Ray; and Cover, Richard James, to Jones & Laughlin Steel Corporation. Corrosion resistant continuous weld pipe. 3,920,051, Cl. 138-155.000.

Bell Telephone Laboratories, Incorporated: *See—*
Anderson, Harold Peter; and Nielson, Carl Calvin, 3,920,912.
Burns, Gary Joseph; Mohlenhoff, Edward Arthur; Pasternack, Gerald Philip; and Strong, Gary Wayne, 3,921,138.
Connor, Denis John, 3,920,889.
Lukas, Frederic, 3,920,911.
Lye, Stephen Walter, 3,920,928.
Schaible, Clifford Warren, 3,921,094.
Shirley, Dorrel Roosevelt; and Stiles, Gilbert Johnson, Sr., 3,920,894.
Smith, George Elwood; and Strain, Robert Joseph, 3,921,195.
Smith, Peter William, 3,920,432.
Tate, Louis David, 3,920,929.
Thompson, Larry Flack, 3,920,454.

Beller, Isi. Speech-training device. 3,920,903, Cl. 179-1.00D.

Bellomo, Andrea. Homokinetic joint. 3,919,861, Cl. 64-21.000.

Bellone, Giulio: *See—*
Ciboldi, Pietro; and Bellone, Giulio, 3,920,939.

Belmont, Elliott T. Television ap$_{p}$aratus to provide supplementary display images. 3,920,893, Cl. 178-7.50R.

Bendix Corporation, The: *See—*
Morse, Robert J.; and Sebo, Milan J., 3,920,046.
Reddy, Junuthula N., 3,919,981.
Rhee, Seong K., 3,920,172.

Benson, Martin James. Coated tennis string and process for coating. 3,920,658, Cl. 428-395.000.

Bentley Engineering Co. Ltd., The: *See—*
Wood, Gillies; and Mitchell, Alfred Edward, 3,919,862.

Beretta, Achille; and Crippa, Giovanni. Openable panel structure suitable for use either as roofing or as a curtainwall for buildings. 3,919,814, Cl. 52-90.000.

Berg, Gerhard; Nordsiek, Karl-Heinz; Sommer, Neithart; Barnstedt, Egge; and Cuntze, Gerhard, to Chemische Werke Huels Aktiengesellschaft. Production of powdery, filler-containing rubber mixtures and the use thereof in the manufacture of tire treads. 3,920,604, Cl. 260-42.540.

Berg Manufacturing Company, The: *See—*
Horowitz, Charles F.; and Klimek, Boleslaw, 3,920,045.

Berg, Robert H. Digital timer. 3,920,961, Cl. 235-92.00T.

Bergbauer, Axel: *See—*
Seyd, Gunter; Bergbauer, Axel; and Paulsen, Uwe, 3,919,880.

Berghezan, Aurel I., to Union Carbide Corporation. Method of making metallic composite materials. 3,919,764, Cl. 228-185.000.

Berglas, Robert E. Digital glucose analyzer. 3,920,969, Cl. 235-151.300.

Beriger, Ernst, to Ciba-Geigy Corporation. O-Ethyl-s-(n)-propyl-s-carbamoylalkyl dithiophosphates. 3,920,771, Cl. 260-943.000.

Bernard, John E., Jr. Twin ventilator fixture. 3,919,927, Cl. 98-2.170.

Bernt, Erich: *See—*
Scheibe, Peter; Bernt, Erich; and Gruber, Wolfgang, 3,920,400.

Berry, Clifford M.; and Curtis, Orson R. Construction safety anchor means. 3,920,221, Cl. 256-59.000.

Bertrand, Olivier, to Societe Generale des Ciments Portland de l'Escaut. Composition based on bitumen and a filler. 3,920,470, Cl. 106-288.00B.

Beschke, Helmut; and Schuler, Wilhelm Alfons, to Deutsche Gold- und Silber-Scheideanstalt vormals Roessler. Process for the production of 2-chloropyridine. 3,920,657, Cl. 260-290.0HL.

Bessho, Takeshi, to Minolta Camera Kabushiki Kaisha. Automatic light control system for demonstrating sunrise and sunset scenes in planetarium. 3,919,787, Cl. 35-42.500.

Bettacchi, Robert J.: *See—*
Barber, Robert C.; Bettacchi, Robert J.; Lundsager, C. Bent; and Wood, Louis L., 3,920,877.

Betteridge, Walter: *See—*
Mynard, Brian Arthur; Jones, Bryan; Tracey, Victor Allen; and Betteridge, Walter, 3,920,407.

Betz, Karl, to Theta Industries, Inc. Electrical zeroing means for a dilatometer. 3,919,879, Cl. 73-16.000.

Bevis, Robert Charles; Viswanathan, Thiagarajan; and Theis, Howard Joseph, to Cincinnati Milacron Inc. Off-line tool gage. 3,920,971, Cl. 235-151.110.

Beyer, Egon; von der Eltz, Hans-Ulrich; and Schuster, Erich, to Hoechst Aktiengesellschaft. Process for the single-bath dyeing of cellulose fibers or mixtures thereof with synthetic fibers with water-insoluble azo dyestuffs produced on the fiber by the exhaustion method. 3,920,386, Cl. 8-21.00C.

Beyer, Karl-Heinz: *See—*
Kindscher, Wolfgang; Beyer, Karl-Heinz; and Wulz, Klaus, 3,920,706.

Bickel, Hans; Bosshardt, Rolf, deceased (by Bosshardt-Schar, Ruth Elisabeth, legal representative); Fechtig, Bruno; Mueller, Johannes; and Peter, Heinrich, to Ciba-Geigy Corporation. Process for preparation of 7-amino-cephalosporanic acid compound. 3,920,638, Cl. 260-243.00C.

Bien, Hans-Samuel: *See—*
Hohmann, Walter; Herzog, Helmut; and Bien, Hans-Samuel, 3,920,632.

Bierlein, Carl A., to General Motors Corporation. Aluminum-iron composite rotor housing for a rotary combustion engine and method of making the same. 3,920,360, Cl. 418-178.000.

Biesheuvel, Arnoldus: *See—*
Voorman, Johannes Otto; Van Hurck, Nicolaas; and Biesheuvel, Arnoldus, 3,921,102.

Bigham, Carroll R.; and Barrie, Ronald E., to United States of America, Air Force. Non-penetrating rib-to-surface structural clip connector assembly. 3,920,206, Cl. 244-132.000.

Bil, Milos S.: *See—*
Feinland, Raymond; Iscowitz, Sigmund; and Bil, Milos S., 3,920,384.

Bille, Heinz: *See—*
Petersen, Harro; Erhardt, Klaus; Ruemens, Wilhelm; and Bille, Heinz, 3,920,390.

Billottet, Henri: *See—*
Narbaits-Jaureguy, Jean-Raymond; and Billottet, Henri, 3,921,127.

Binard, William J.: *See—*
Dye, John F.; Binard, William J.; and Patel, Bhupendra C., 3,920,002.
Dye, John F.; and Binard, William J., 3,920,023.

Binczyk, Franciszek: *See—*
Gierek, Adam; Binczyk, Franciszek; and Bylica, Andrzej, 3,920,451.

Binder, Karl, to Johann Baptist Rombach, Firma. Liquid flow meter. 3,919,887, Cl. 73-251.000.

Birch, Richard Wykeham Beaufoy. Pickup guidance mechanisms. 3,920,249, Cl. 274-23.00A.

Birch, William: *See—*
Brissaud, Jean; and Birch, William, 3,920,518.

Birkner, Helmut: *See—*
Diebel, Klaus; and Birkner, Helmut, 3,920,606.

Birman, Paul; and Nercessian, Sarkis, to Forbro Design Corporation. Power supply incorporating, in series, a stepped source and a finely regulated source of direct current. 3,921,059, Cl. 323-21.000.

Birnkraut, Hans-Walter: *See—*
Feichtinger, Hans; Noeske, Heinz; and Birnkraut, Hans-Walter, 3,920,713.

Birum, Gail H., to Monsanto Company. Ureidoalkylphosphonic acids. 3,920,733, Cl. 260-502.500.

Bishop, Sarah-Ann; Marmion, Joseph D.; and Montante, Alan R., to Xerox Corporation. Communications systems having a selective facsimile output. 3,920,896, Cl. 178-26.00R.

Bissell, Sherman M.; and Hopland, Johan N., to Boeing Company, The. Rejected take-off (RTO) control for automatic braking system. 3,920,204, Cl. 244-111.000.

Biswas, Amit Kumar; and Leventer, Robert S., to Schloemann-Siemag AG. Extrusion member for positioning behind the rear face of material to be extruded in an extrusion press. 3,919,873, Cl. 72-257.000.

Black, Stanley A.; and Sergev, Sergius S., to United States of America, Navy. Electrode gap control for electro chemical batteries and heat generation systems. 3,920,476, Cl. 136-100.00R.

Blackburn, George L.: *See—*
Flatt, Jean-Pierre; and Blackburn, George L., 3,920,838.

Blaha, Robert F., to Texas Instruments Incorporated. Solid state electrical switch. 3,921,117, Cl. 338-13.000.

Blais, Leo: *See—*
Wilkinson, Michael C.; Blais, Leo; Martin, Wilhelm N.; and Tesainer, Silvano, 3,920,496.

Blanco, Raymond E.: *See—*
Godbee, Herschel W.; Cathers, George I.; and Blanco, Raymond E., 3,920,577.

Blatt, Leland F. Flow control valve. 3,920,042, Cl. 137-523.000.

Blatt, Leland F. Vertical lift toggle clamp. 3,920,234, Cl. 269-94.000.

Blauert, Jens; and Laws, Peter, to Eugen Beyer Elektrotechnische Fabrik. Method and apparatus for imparting to headphones the sound-reproducing characteristics of loudspeakers. 3,920,904, Cl. 179-1.00G.

Bleher, William A.: *See—*
McGrath, Ronald P.; and Bleher, William A., 3,921,213.

Blodinger, Jack: *See—*
Nessel, Robert J.; and Blodinger, Jack, 3,920,806.

Bloom Engineering Company, Inc.: *See—*
Hovis, James E.; and Johns, James E., 3,920,382.

Blue, Steven C.; Curtis, Mark T.; Orthwein, William C.; and Stitt, Daniel H., to United States of America, Energy Research and Development Administration. Key-and-keyway coupling for transmitting torque. 3,920,343, Cl. 403-356.000.

Bluestone, Leonard L., to L. B. Manufacturing Company. Elbow connector and method of forming it. 3,920,271, Cl. 285-176.000.

Blum, Helmut: *See—*
Schmidt-Dunker, Manfred; Ploger, Walter; Worms, Karl-Heinz; Blum, Helmut; and Gloxhuber, Christian, 3,920,837.

Blumenkranz, James J.: *See—*
McDowell, Jon J.; and Blumenkranz, James J., 3,920,787.

Bocher, Dominique; and Pilet, Charles. Antibiotic composition containing an antibiotic and as a potentiating agent pyrrolidone carboxylic acid or derivative thereof. 3,920,814, Cl. 424-115.000.

Bodrova, Margarita Romanovna: *See—*
Golyshin, Nikolai Mikhailovich; Andreeva, Elena Ivanovna; Dvoichenkova, Elza Alexandrovna; Ukrainets, Nina Sergeevna; Skazkina, Tatyana Pavlovna; Solovieva, Galina Viktorovna; Bodrova, Margarita Romanovna; Rotastikova, Nina Alexandrovna; Melnikov, Nikolai Nikolaevich; Kukalenko, Stepan Sofronovich; Nuridzhanian, Karen Armenakovich; Nesterova, Lilia Mikhailovna; Usmanov, Marat Tashpulatovich; Novikova, Raisa Grigorievna; Kuznetsova, Galina Vladimirovna; Volodkovich, Stepan Dmitrievich; Burmakin, Nikolai Mikhailovich; Obukhova, Valentina Ivanovna; Monova, Violetta Ivanovna; Shkuratova, Galina Nikonovna; Sanin, Mikhail Arsenievich; Kulagina, Natalya Nikolaevna; and Mironova, Nina Evgenievna, 3,920,680.

Bodzin, Jason H. Subclavian vena puncture devices. 3,920,013, Cl. 128-214.400.

Boehly, Michael A.; and Randmere, Uno, to Stromberg-Carlson Corporation. Generator used for time synchronization in videotelephone. 3,920,901. Cl. 178-69.50G.

Boehm, Rudolph A.; Borchardt, Gerald N.; and Zahlit, Wayne A., to International Harvester Company. Mule driver idler lockout device. 3,919,893, Cl. 74-242.15R.

Boehringer & Co.: *See—*
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Boehringer Ingelheim GmbH: *See—*
Nickl, Josef; Teufel, Helmut; Engel, Wolfhard; Seeger, Ernst; and Engelhardt, Gunther, 3,920,668.
Schroder, Ludwig; Thomas, Klaus; and Goeth, Hanns, 3,920,821.

Boehringer Mannheim GmbH: *See—*
Scheibe, Peter; Bernt, Erich; and Gruber, Wolfgang, 3,920,400.

Boehringer, Paul; and Heiligenmann, Erwin, to Boehringer & Co. Machine for the production and cleaning of exposed aggregate slabs. 3,920,369, Cl. 425-253.000.

Boeing Company, The: *See—*
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DeVlieg, Garrett H., 3,920,282.
Moorehead, James R., 3,920,203.

Bogue, John C.: *See—*
Sarbacher, Robert I.; and Mauch, Robert E., 3,921,033.

Bohm, Kurt; and Scheiber, Robert, to Vockenhuber, Karl; and Hauser, Rainund. Method of and system for generating video signals in color television. 3,921,206, Cl. 358-41.000.

Bohner, Beat: *See—*
Meyer, Willy; and Bohner, Beat, 3,920,676.
Meyer, Willy; and Bohner, Beat, 3,920,677.

Bohny, Fritz; Egli, Willi; and Schwank, Max, to Ciba-Geigy AG. Process for dyeing leather. 3,920,385, Cl. 8-12.000.

Boivin, Joseph J. R.: *See—*
Hamilton, Douglas D.; and Boivin, Joseph J. R., 3,920,057.

Bojardi, Tiziano. Stopper for containers, especially bottles and flasks. 3,920,141, Cl. 215-251.000.

Boldreaux, Sterling M.: *See—*
McGregor, John D.; and Boldreaux, Sterling M., 3,920,145.

Bollman, Robert L.: *See—*
VandenBerg, Willard J.; Ramsey, Robert E.; Pieczko, George; Bollman, Robert L.; and Krackenberger, Richard E., 3,920,541.

Bolter, Bernard J.: *See—*
Czaplinski, Thomas V.; Bolter, Bernard J.; Heyer, Robert E.; and Bruno, Gerald A., 3,920,995.

Bolton-Emerson, Inc.: *See—*
Herzog, Peter, 3,919,974.

Bolton, Robert A., to General Motors Corporation. Controller for proportional control of reducing converter air. 3,919,842, Cl. 60-289.000.

Bomberger, Howard B., Jr., to RMI Company. Method of handling corrosive substances. 3,919,761, Cl. 29-428.000.

Bonaparte, Leo R.; Golliday, J. Barry; and Zeller, H. James, to Procter & Gamble Company, The. Detergent compositions. 3,920,586, Cl. 252-531.000.

Bookless, George W.: *See—*
Murre, Robert W.; and Bookless, George W., 3,920,332.

Borchardt, Gerald N.: *See—*
Boehm, Rudolph A.; Borchardt, Gerald N.; and Zahlit, Wayne A., 3,919,893.

Borelly, Wolfgang. Process for the manufacture of parallel wire strands for bridges and the like by winding and unwinding. 3,919,762, Cl. 29-447.000.

Borg, Hakan Gunnar: *See—*
Anderson, Lars-Olov; Borg, Hakan Gunnar; Forsman, Nanna; Hanshoff, Gunnar; Lindroos, Goran; Miller-Andersson, Maggie; and Ehrenberg, Elisabeth Charlotte, 3,920,625.

Borg-Warner Corporation: *See—*
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Borgmann, John P.: *See—*
Rogers, Orris A.; Camp, Eldridge K.; and Borgmann, John P., 3,920,524.

Borowski, Kurt; Stumpf, Friedrich; and Wagensonner, Eduard, to Agfa-Gevaert AG. Compensation of response sluggishness of photoelements employed in automatic exposure timers. 3,921,184, Cl. 354-32.000.

Borsotti, Giampiero: *See—*
Ribaldone, Giuseppe; and Borsotti, Giampiero, 3,920,741.

Boryta, Daniel A., to Foote Mineral Company. Oxygen-generating granules. 3,920,803, Cl. 423-579.000.

Bossert, Friedrich: *See—*
Meyer, Horst; Bossert, Friedrich; Vater, Wulf; and Stoepel, Kurt, 3,920,823.

Bosshardt, Rolf, deceased: *See—*
Bickel, Hans; Bosshardt, Rolf, deceased; Fechtig, Bruno; Mueller, Johannes; and Peter, Heinrich, 3,920,638.

Bosshardt-Schar, Ruth Elisabeth, legal representative: *See—*
Bickel, Hans; Bosshardt, Rolf, deceased; Fechtig, Bruno; Mueller, Johannes; and Peter, Heinrich, 3,920,638.

Bostik G.m.b.H.: *See—*
Goetz, Guenther, 3,919,821.

Boston, Frank J.; and Nery, Victor W. Process for producing a bonded particulate material. 3,920,460, Cl. 106-38.300.

Bouffard, William W.: *See—*
Hosking, John S., 3,919,789.

Bourassa, Joseph R.; and Lopez, Manuel, to Parker Hannifin Corporation. Windshield wiper blade unit. 3,919,736, Cl. 15-250.420.

Bourke, Bernard J., to Universal Oil Products Company. Swing hammer rapping system for electrostatic precipitator. 3,920,085, Cl. 173-99.000.

Bowers, David L., to Vitatron Medical B.V. Threshold tracking system and method for stimulating a physiological system. 3,920,024, Cl. 128-419.0PG.

Bowker, David Edward: *See—*
Baynes, Frederick; and Bowker, David Edward, 3,920,393.

Bowles, David L.: *See*—
Kernick, Andress; Rosa, John; and Bowles, David L., 3,921,038.
Bowman, Donald B. Hemodialysis system. 3,920,556, Cl. 210-321.000.
Bozeman, James D.: *See*—
Ray, Donald R.; and Bozeman, James D., 3,919,957.
Braddick, Britt O.; and Lindsey, Hiram E., to Texas Iron Works, Inc. Method for positioning a liner on a tubular member in a well bore with a retrievable pack off bushing therebetween. 3,920,075, Cl. 166-290.000.
Bradley, Arthur Albert, to Trelleborgs Gummifabrik Aktiebolag. Liners for comminution apparatus. 3,920,191, Cl. 241-182.000.
Bradley Corporation: *See*—
Barnum, Thomas G.; Hessler, Frank; and Larson, Robert A., 3,920,216.
Bradley, Robert C., to Lloyd A. Fry Roofing Company. Roof shingle. 3,919,823, Cl. 52-557.000.
Bradt, Rexford H., to Jeffers, Albert L. Filament forming apparatus with sweep fluid channel surrounding spinning needle. 3,920,362, Cl. 425-72.000.
Braman, John R. Tool for facilitating removal of screw-cap bottle closures. 3,919,901, Cl. 81-3.400.
Brandenburg, John T.: *See*—
McCoy, Frederic C.; and Brandenburg, John T., 3,920,540.
Brander, James Edward, to International Combustion Australia Limited. Method and apparatus for regulating rotary vibrators. 3,920,222, Cl. 259-1.00R.
Brandes, Arthur H., to Brandes Enterprises, Inc. Locker units. 3,920,297, Cl. 312-217.000.
Brandes Enterprises, Inc.: *See*—
Brandes, Arthur H., 3,920,297.
Brandt, Thomas F.: *See*—
Netzel, Philip C.; Brandt, Thomas F.; and Strack, Harold F., 3,920,938.
Branson Ultrasonics Corporation: *See*—
Obeda, Edward G.; and Kramer, George C., 3,921,015.
Shoh, Andrew; and Holze, Ernest P., Jr., 3,920,504.
Brebner, Raymond Ian. Stairway platform. 3,920,097, Cl. 182-107.000.
Bredsted, Ole Jacobsen, to Nordisk Ventilator Co., A/S. Impeller wheel for an axial flow fan with adjustable vanes. 3,920,353, Cl. 416-168.000.
Breed, Allen K.: *See*—
Breed, David S.; Thuen, Torbjorn; and Breed, Allen K., 3,919,941.
Breed, David S.; Thuen, Torbjorn; and Breed, Allen K. Liquid timing device. 3,919,941, Cl. 102-78.000.
Brewer, Arthur D.; Neidermyer, Robert W.; and McIntire, William S., to Uniroyal, Inc.; and Uniroyal Ltd. Substituted dithin tetroxide plant growth regulants. 3,920,438, Cl. 71-73.000.
Brewster, Linda C.: *See*—
Hasegawa, Shin; Brewster, Linda C.; and Maier, Vincent P., 3,920,851.
Brgelz, Franc, to Northern Electric Company Limited. Variable attenuation equalizer. 3,921,105, Cl. 333-28.00R.
Bridewell, Alan R.; and Eames, George F., to Eastern Electronics (Norwich) Limited. Transformer with relatively movable sections. 3,921,114, Cl. 336-90.000.
Bridges, Donald W.: *See*—
Fassell, W. Martin; and Bridges, Donald W., 3,920,548.
Brieske, Bernard F., to Vision-Wrap Industries, Inc. Method of making flexible plastic articles. 3,920,500, Cl. 156-251.000.
Brightman, Barrie; Datsko, George; Moll, Edward W.; and Stewart, William H., to Stromberg-Carlson Corporation. Digital switching network. 3,920,916, Cl. 179-15.0AL.
Brissaud, Jean; and Birch, William, to Technigaz; and Nuclear Power Group Limited, The. Pressure vessels having thermal insulsation. 3,920,518, Cl. 176-87.000.
British Domestic Appliances Limited: *See*—
Sanderson, Neville Edward; and Youngs, Bertram Benjamin, 3,920,375.
British Steel Corporation: *See*—
Cleland, William Pettigrew; and Goldie, William Law, 3,920,132.
Bromberg, Menashe, to Thomas & Betts Corporation. Conversion kit for liquid tight connector. 3,920,304, Cl. 339-94.00M.
Brooke, Alan H.: *See*—
Tu, Peter K. C.; Brooke, Alan H.; and Miller, Frank S., 3,920,426.
Brooks, Maurice E.: *See*—
Riegel, Herbert; Schindler, Harvey D.; Sze, Morgan C.; and Brooks, Maurice E., 3,920,764.
Brotzmann, Karl: *See*—
Knuppel, Helmut; Brotzmann, Karl; and Fassbinder, Hans Georg, 3,920,448.
Broverman, Alvin Y., to Kuhlman Corporation. Cooling radiator for fluid cooled power transformers and the like. 3,921,112, Cl. 336-58.000.
Brown, David F.; and Urban, Harold C., to Colorado Time Systems, Inc. Pressure actuated switch and method for making same. 3,920,940, Cl. 200-52.00R.
Brown, Gaylord William. Lip folding apparatus. 3,920,373, Cl. 425-392.000.
Brown, George T., Jr.; Clark, Donald B.; and Koopman, Donald E., to Djinnii Industries, Inc. Solidification retardation of liquid crystalline compositions with steroid derivatives of isostearyl carbonate. 3,920,574, Cl. 252-299.000.
Brown, Henry; and Tomaszewski, Thaddeus W., to Oxy Metal Industries Corporation. Electrodeposition of films of particles on cathodes. 3,920,468, Cl. 106-286.000.
Brown, Henry L., Jr.: *See*—
Everhardt, William F.; and Brown, Henry L., Jr., 3,920,498.
Brown, Melacthon S.; and Kohn, Gustave K., to Chevron Research Company. Insecticidal N-[(N'-acylamido)thio]aryl carbamates. 3,920,830, Cl. 424-300.000.
Brown, Merle S., to Jet Spray Cooler, Inc. Beverage dispenser with in-bowl whipper. 3,920,163, Cl. 222-190.000.
Brown, William W.: *See*—
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Browning Arms Company: *See*—
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Browning, Val A., to Browning Arms Company. Facile loading repeating firearm. 3,919,800, Cl. 42-17.000.
Broxholm, Thomas M.; and Elmore, Lester C., to Pulsepower Systems, Inc. Modular liquid propellant gun. 3,919,922, Cl. 91-37.000.
Bruderlein, Francois T.; and Humber, Leslie G., to Ayerst, McKenna and Harrison Ltd. Benzocycloheptaisoquinoline derivatives III. 3,920,820, Cl. 424-258.000.
Bruggeman, William L., to Cat Pumps Corporation. Reciprocating pump. 3,920,356, Cl. 417-511.000.
Brun, Marcel. Servo-stabilizing arrangement for the speeds of vehicle wheels with deliberate braking. 3,920,281, Cl. 303-21.00R.
Brunelle, William; and Cartwright, James W., to Weatherhead Company, The. Abrasion resistant flexible hose. 3,920,786, Cl. 264-251.000.
Bruno, Gerald A.: *See*—
Czaplinski, Thomas V.; Bolter, Bernard J.; Heyer, Robert E.; and Bruno, Gerald A., 3,920,995.
Brunswick Corporation: *See*—
Clark, Raymond C., 3,920,095.
Bryant, John D.; and Hartsell, Glenn A., to Texas Instruments Incorporated. Electronic calculator chip having test input and output. 3,921,142, Cl. 340-172.500.
Bryant, Richard W., to Nova Productions, Inc. Sound sensor and adapter. 3,920,319, Cl. 352-39.000.
Bryant, Robert G., to Gem Industries, Inc. Double locking gate shoe and trip for crib drop sides. 3,919,728, Cl. 5-100.000.
Bryne, Sydnor H., Jr.: *See*—
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Buchanan, Edward R., to General Electric Company. Method of making superalloy bodies. 3,920,489, Cl. 148-32.000.
Buchanan, James E.: *See*—
Avellar, Karl B.; and Buchanan, James E., 3,920,973.
Buchel, Karl-Heinz; and Stendel, Wilhelm, to Bayer Aktiengesellschaft. 1-Alkylsulphonyl-2-trifluoromethyl-benzimidazoles. 3,920,681, Cl. 260-309.200.
Bucher, Erich, to Zinser-Textilmaschinen GmbH. Apparatus for altering the length of synthetic strands. 3,919,748, Cl. 28-71.300.
Buckle, Derek Richard; and Smith, Harry, to Beecham Group Limited. Biologically active compounds. 3,920,725, Cl. 260-468.00G.
Buckle, Derek Richard: *See*—
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Budkevich, Alexandr Georgievich: *See*—
Genkin, Vitaly Yakovlevich; Gankin, Vladimir Borisovich; Budkevich, Alexandr Georgievich; and Sirota, Vladimir Efremovich, 3,920,064.
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Buescher, William E.; and Kerstetter, Donald R., to GTE Sylvania Incorporated. Method of making fast warm up picture tube cathode cap having high heat emissivity surface on the interior thereof. 3,919,751, Cl. 29-25.180.
Bugaut, Andree: *See*—
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Bun, Cheong Chee. Induction systems for internal combustion engines. 3,919,988, Cl. 123-119.00E.
Bundschuh, Robert L., to Martin, Lionel C.; and Mitsui Mining & Smelting Co., Ltd. Occupant-propelled vehicle. 3,920,263, Cl. 280-106.000.
Buono, Gerard A. M. Traffic signal box. 3,921,131, Cl. 340-139.000.
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Burford, Leonard W.; and Burford, Charles E. Apparatus for tying packages and wrapping materials. 3,919,829, Cl. 53-135.000.
Burger, Erich, to Siemens Aktiengesellschaft. Circuit arrangement for frequency-differential phase modulation. . 3,921,103, Cl. 332-11.00D.
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hailovna; Usmanov, Marat Tashpulatovich; Novikova, Raisa Grigorievna; Kuznetsova, Galina Vladimirovna; Volodkovich, Stepan Dmitrievich; Burmakin, Nikolai Mikhailovich; Obukhova, Valentina Ivanovna; Monova, Violetta Ivanovna; Shkuratova, Galina Nikonovna; Sanin, Mikhail Arsenievich; Kulagina, Natalya Nikolaevna; and Mironova, Nina Evgenievna, 3,920,680.

Burn, Ian: *See—*
Eror, Nicholas G.; Burn, Ian; and Maher, Galeb H., 3,920,781.

Burns, Clarence B., to RTE Corporation. Arc-out shut off valve assembly for a high voltage bushing. 3,920,307, Cl. 339-111.000.

Burns, Gary Joseph; Mohlenhoff, Edward Arthur; Pasternack, Gerald Philip; and Strong, Gary Wayne, to Bell Telephone Laboratories, Incorporated. Multipoint data communications systems utilizing multipoint switches. 3,921,138, Cl. 340-147.00R.

Buroni, Vittorio, to Industrie Pirelli Societa Per Azioni. Pressurized cable accessory connector. 3,920,884, Cl. 174-21.00R.

Burroughs Corporation: *See—*
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Emm, Michael Gene; and Kim, Dongsung Robert, 3,921,145.
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Burzen, Norman J., to Nordon Industries, Inc. Payout unit having antijackpotting protection. 3,920,029, Cl. 133-2.000.

Busche, William W.: *See—*
Baker, Joseph R.; Busche, William W.; and Hindell, Sidney E., 3,920,991.

Busuttil, John J.: *See—*
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Butler, L. Dennis; and Furtado, Anthony E., to Sperry Rand Corporation. Bale position sensing and control mechanism. 3,920,133, Cl. 214-6.00B.

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Butler, Stuart, to Technovators, Inc. Impeller loading device. 3,920,116, Cl. 198-128.000.

Butula, Ivan, to Rhein-Chemie GmbH. Process for producing 4,5,6,7-tetrahydro benzimidazoles. 3,920,678, Cl. 260-309.000.

Buzby, George C., Jr.; and Shah, Harshavedan C., to American Home Products Corporation. 2,3,6,7-Tetrahydro-6-phenyl-5H-imidazo[1,2-d][1,4]benzodiazepin-5-ones and diazepines. 3,920,687, Cl. 260-309.600.

Buzova, Zoya Mikhailovna: *See—*
Nabiullin, Faat Khatovich; Buzova, Zoya Mikhailovna; Gertsik, Efim Mikhailovich; Koval, Ivan Ivanovich; Maslov, Vladimir Mikhailovich; and Khamits, Ljudmila Nikolaevna, 3,920,475.

Byers, James Otto, Jr., to Tomco, Inc. Proportional bypass valve having variable area orifice control means. 3,920,034, Cl. 137-116.000.

Bylica, Andrzej: *See—*
Gierek, Adam; Binczyk, Franciszek; and Bylica, Andrzej, 3,920,451.

C.A.V. Limited: *See—*
Jarrett, Boaz Antony; and Fenne, Ivor, 3,919,989.

C. J. Kennedy Company: *See—*
Gray, Martin D., 3,921,212.

Cabut, Louis Antoine: *See—*
Kienzle, Jean Andre Paul; Huille, Michel Ernest Antoine; and Cabut, Louis Antoine, 3,920,469.

Caddock, Richard E. Film-type cylindrical resistor. 3,921,119, Cl. 338-217.000.

Cadogan-Rawlinson, Christopher Robert Johnston; and Kinley, John Ross. Press. 3,920,364, Cl. 425-135.000.

California Institute of Technology: *See—*
Houseman, John, 3,920,416.

Callen, Virginia R. Footwear drip stall. 3,920,144, Cl. 220-22.000.

Caltagirone, Saverio, to Construction Materials Division General Electric Company. Anchor strip for securing a conductor in a transformer coil. 3,921,115, Cl. 336-192.000.

Calvi, Salvatore J.: *See—*
Toto, John A.; and Calvi, Salvatore J., 3,920,328.

Calvin, John Norman, to Combustion Engineering, Inc. Emergency core cooling spray head. 3,920,514, Cl. 176-38.000.

Cameron Iron Works, Inc.: *See—*
Allen, Herbert, 3,920,038.
Cegielski, Eugene J., 3,920,071.

Camilo Muebles, Inc.: *See—*
Lopez, Jose, 3,920,298.

Camp, Eldridge K.: *See—*
Rogers, Orris A.; Camp, Eldridge K.; and Borgmann, John P., 3,920,524.

Campbell, Louie A.: *See—*
Gothreaux, Roger L.; and Campbell, Louie A., 3,920,245.

Canadian International Paper Company: *See—*
Katzen, Raphael; Diebold, Vincent B.; and Mestemaker, Jerald L., 3,920,750.

Canbar Industrial Plastics: *See—*
Glandfield, Robert J., 3,919,865.

Canceill, Bernard Jean Jacques: *See—*
Regnier, Albert; Canceill, Bernard Jean Jacques; Kevorkian, Kevork; and Lager, Jean Paul, 3,920,914.

Candlin, Francis T. Lockable bicycle rack. 3,920,126, Cl. 211-5.000.

Cannan, Bernard M., to Service Master Industries, Inc. Method for cleaning carpets. 3,919,729, Cl. 8-158.000.

Canon Kabushiki Kaisha: *See—*
Kitajima, Tadayuki; and Suda, Masashi, 3,920,238.
Komori, Shigehiro; Sakamaki, Hisashi; Hattori, Hiroyuki; Iida, Toshihide; Miyamoto, Koichi; and Umezawa, Kazumi, 3,919,972.
Nakamura, Zenzo, 3,921,034.
Yazaki, Mutsunobu, 3,921,185.

Caprioglio, Luigi, to Siv Deltix S.p.A. Welding machine with a disassemblable column. 3,920,950, Cl. 219-88.000.

Capuano, Terry D.: *See—*
Heldmann, Ernest J.; and Capuano, Terry D., 3,920,060.

Card & Co., Inc.: *See—*
Card, Roy T.; and Hill, Rodney E., 3,919,953.

Card, Roy T.; and Hill, Rodney E., to Card & Co., Inc. Apparatus for tufting spaced rows of loop pile and cut pile. 3,919,953, Cl. 112-79.00R.

Carey, Robert P., to Owens-Corning Fiberglas Corporation. Support for bushing for containing molten mineral material. 3,920,430, Cl. 65-1.000.

Cargille, Donald R., to Hughes Aircraft Company. Horizon sensor. 3,920,994, Cl. 250-347.000.

Caricchio, Jerome J., Jr.; Saxenmeyer, George J., Jr.; and York, Edward R., to International Business Machines Corporation. Process for the electrodeposition of ductile palladium and electroplating bath useful therefor. 3,920,526, Cl. 204-47.000.

Caristi, Robert F.; Leonard, Donald A.; and Itzkan, Irving, to Avco Everett Research Laboratory, Inc. Crossed-field excitation, pulsed gas laser. 3,921,097, Cl. 331-94.50G.

Carlson, Sheldon D.: *See—*
Lichtenwalter, Glen D.; and Carlson, Sheldon D., 3,920,523.

Carlton, Robert D.; Chamberlin, Davis W.; and Featherstone, Thomas W., to Minnesota Mining and Manufacturing Company. Sheet binding machine. 3,920,501, Cl. 156-364.000.

Carmichael-Drage, John: *See—*
Day, Ian Harold; and Carmichael-Drage, John, 3,920,499.

Carr, Leslie: *See—*
O'Donnell, William; and Carr, Leslie, 3,921,130.

Carson, Phillip Alfred; and Tissington, Peter, to Lever Bros. Co. Detergent composition having substituted phthalic acid salt builder. 3,920,569, Cl. 252-89.000.

Carter, Alan W.; and Franklin, Robert C., to Beckman Instruments, Inc. Overspeed protection system for centrifuge apparatus. 3,921,047, Cl. 318-313.000.

Carter, Cecil O., to Phillips Petroleum Company. Isoparaffin-olefin alkylation using HF-ethyl fluoride catalysis with recovery of ethyl fluorine and alkylation of secondary and tertiary alkyl fluorides. 3,920,767, Cl. 260-683.480.

Cartwright, James W.: *See—*
Brunelle, William; and Cartwright, James W., 3,920,786.

Casale, Robert; and Spector, George. Shampoo dispenser. 3,920,160, Cl. 222-162.000.

Casio Computer Co., Ltd.: *See—*
Kashio, Toshio, 3,919,835.

Castela, Andre; Susbielles, Gilles; and Duc, Xuong Nguyen, to Institut Francais du Petrole, Des Carburants et Lubrifiants. Floating burner apparatus for submarine petroleum installations. 3,920,378, Cl. 431-202.000.

Cat Pumps Corporation: *See—*
Bruggeman, William L., 3,920,356.

Caterpillar Tractor Co.: *See—*
Bell, Francis D., 3,920,286.

Cathers, George I.: *See—*
Godbee, Herschel W.; Cathers, George I.; and Blanco, Raymond E., 3,920,577.

CBS Inc.: *See—*
Sharp, Paul H., 3,920,905.

Ceccato, Giovanni; Geri, Sergio; and Colombo, Luigi, to Montedison S.p.A. Curable compositions based on elastomeric vinylidene fluoride copolymers, process for curing the compositions, and the cured compositions. 3,920,620, Cl. 260-79.50C.

Cecchi, Giannangiolo: *See—*
Lega, Berlando; and Cecchi, Giannangiolo, 3,920,181.

Cederstrand, Carl N.; and Keegan, Jack J., to Beckman Instruments, Inc. Piggyback optical bench. 3,920,993, Cl. 250-343.000.

Cegielski, Eugene J., to Cameron Iron Works, Inc. Well apparatus. 3,920,071, Cl. 166-182.000.

Celanese Corporation: *See—*
Druin, Melvin L.; Loft, John T.; and Plovan, Steven G., 3,920,785.
Freed, William T., 3,920,602.
Wu, Anthony; and Thigpen, Hubert H., 3,920,754.

Central Soya Company, Inc.: *See—*
Barker, Thomas G.; Young, Larry L.; and Endres, Joseph G., 3,920,857.
Dykstra, Gerald M.; and Hollingsworth, Rabon L., 3,920,592.

Cerny, Jaroslav R.: *See—*
Van Horne Jinivisian, Sydney C.; and Cerny, Jaroslav R., 3,919,795.

Cervay, Russell R.: *See—*
Gunderson, Allan W.; and Cervay, Russell R., 3,919,884.

Chaba, Harry P. Sight-mounting bars for pistols. 3,919,781, Cl. 33-233.000.

Chabardes, Pierre; and Querou, Yvon, to Rhone-Poulenc. Process for the preparation of ethylenic carbonyl compounds. 3,920,751, Cl. 260-601.00R.

Chalaust, Rene Bernard Albert. Composition for medical, veterinary of cosmetological use containing a diethyl pyrocarbonate. 3,920,847, Cl. 424-301.000.

Chamberlin, Davis W.: *See—*
Carlton, Robert D.; Chamberlin, Davis W.; and Featherstone, Thomas W., 3,920,501.

Chambley, Phillip W., to Champion International. Method and apparatus for measuring yarn twist set. 3,919,886, Cl. 73-160.000.

Champion International: *See—*
Chambley, Phillip W., 3,919,886.

Chang, Roger: *See—*
Jones, Freeman B., Jr.; Chang, Roger; and Parry, Edward P., 3,920,576.

Chapman, Jack C., to Minnesota Mining and Manufacturing Company. Contact duplication of magnetic signals utilizing a dual-material intermediate including both low $T_c$ and high $T_c$ material. 3,921,208, Cl. 360-17.000.

Chase Brass and Copper Co.: *See—*
Law, Anthony G., 3,919,906.

Chem Systems: *See—*
Spitz, Peter H.; and Frank, Marshall E., 3,920,716.

Chemische Werke Huels, Aktiengesellschaft: *See—*
Baxmann, Fritz; Frese, Albert; Dietrich, Johann; and Hahmann, Otto, 3,920,621.
Berg, Gerhard; Nordsiek, Karl-Heinz; Sommer, Neithart; Barnstedt, Egge; and Cuntze, Gerhard, 3,920,604.
Diebel, Klaus; and Birkner, Helmut, 3,920,606.
Streck, Roland, 3,920,714.
Streck, Roland; and Weber, Heinrich, 3,920,715.

Chemsoil Corporation: *See—*
Collins, Dwight Dixon, 3,920,421.

Chenausky, Peter P.; DeMaria, Anthony J.; Fradin, David W.; and Freiberg, Robert J., to United Technologies Corporation. Unstable split mode laser resonator. 3,921,096, Cl. 331-94.50C.

Chesky, Sheldon R., to Kendall Company, The. Controlled pressure surgical dressing and method of making same. 3,920,010, Cl. 128-156.000.

Chevron Research Company: *See—*
Brown, Melacthon S.; and Kohn, Gustave K., 3,920,830.
Crocker, Richard E., 3,920,571.
Foehr, Edward G., 3,920,562.
King, John M.; and Peeler, Robert L., 3,920,572.
Stewart, William T.; and Schmidt, Robert J., 3,920,467.

Chia, Enrique C.: *See—*
Schoerner, Roger J.; and Chia, Enrique C., 3,920,411.

Chinoin Gyogyszer- Es Vegyeszeti Termekek Gyara Rt.: *See—*
Ecsery, Zoltan; Hermann nee Voros, Judit; Voros, Nee; Torok, Zoltan; and Dvorcsak, Peter, 3,920,651.

Chovan, Joseph L.; and Manoni, Albert J., to General Electric Company. Laser etching apparatus for forming photographic images on metallic surfaces. 3,920,951, Cl. 219-121.00L.

Christensen, Bruce A.; and Raymond, George A., to Sperry Rand Corporation. Information storage security system. 3,920,976, Cl. 235-153.0AM.

Christenson, Roger M.: *See—*
Anderson, Carl C.; Christenson, Roger M.; and Wiegmann, Egon Fritz, 3,920,595.

Christoff, James T., to United States of America, Navy. Track generator. 3,921,122, Cl. 340-3.00R.

Christopherson, Herman P., to Toro Company, The. Mower and discharge apparatus therefor. 3,919,832, Cl. 56-320.200.

Chromalloy American Corporation: *See—*
Wachtell, Richard L.; and Palmenberg, Edward C., 3,920,947.

Chu, David Chau-Kwong, to Hewlett-Packard Company. Startable phase-locked loop oscillator. 3,921,095, Cl. 331-1.00A.

Ciba-Geigy AG: *See—*
Bohny, Fritz; Egli, Willi; and Schwank, Max, 3,920,385.
Desai, Nalin Binduprasad; and Jenny, Walter, 3,920,719.
Jaeger, Horst, 3,920,689.
Schibler, Luzius; and Merz, Jurg, 3,920,645.

Ciba-Geigy Corporation: *See—*
Beriger, Ernst, 3,920,771.
Bickel, Hans; Bosshardt, Rolf, deceased; Fechtig, Bruno; Mueller, Johannes; and Peter, Heinrich, 3,920,638.
Kristinsson, Haukur; Hubele, Adolf; and Aufderhaar, Ernst, 3,920,669.
Meyer, Willy; and Bohner, Beat, 3,920,676.
Meyer, Willy; and Bohner, Beat, 3,920,677.
Porret, Daniel; and Stockinger, Friedrich, 3,920,683.
Porret, Daniel; and Habermeier, Jurgen, 3,920,685.
Ramey, Chester E.; and Luzzi, John J., 3,920,659.
Ramey, Chester E.; and Luzzi, John J., 3,920,661.
Rufenacht, Kurt, 3,920,671.
Spivack, John D.; and Luzzi, John J., 3,920,712.
Wasley, Jan W. F., 3,920,839.

Ciboldi, Pietro; and Bellone, Giulio, to Magrini Galileo S.p.A. Circuit breaker protective shutter apparatus. 3,920,939, Cl. 200-50.0AA.

Cilento, Guido D., to AMF Incorporated. Positioning device for filter cartridge assembly. 3,920,553, Cl. 210-232.000.

Cincinnati Milacron Inc.: *See—*
Bevis, Robert Charles; Viswanathan, Thiagarajan; and Theis, Howard Joseph, 3,920,971.
Corwin, Merton Dudley, Jr.; Hohn, Richard Edward; and Tarvin, Ronald Lee, 3,920,972.
Ma, Carlton Y. W.; and Ailman, Edwin Dean, 3,920,367.

Cirrito, Anthony J. Method for hot gas heat transfer, particularly for paper drying. 3,919,783, Cl. 34-23.000.

Citizen Watch Co., Ltd.: *See—*
Murakami, Tomomi; and Tsuzuki, Akira, 3,919,834.

Claeys, Norbert: *See—*
Descamps, Marcel; Gubin, Jean; and Claeys, Norbert, 3,920,707.

Claflin, Hyle K., to Westran Corporation. Landing gear foot. 3,920,094, Cl. 280-150.500.

Clairol Incorporated: *See—*
Feinland, Raymond; Iscowitz, Sigmund; and Bil, Milos S., 3,920,384.

Clampitt, Richard L.: *See—*
Hessert, James E.; and Clampitt, Richard L., 3,919,849.

Clark, Donald B.: *See—*
Brown, George T., Jr.; Clark, Donald B.; and Koopman, Donald E., 3,920,574.

Clark, John R.: *See—*
Strother, Claude, Jr.; and Clark, John R., 3,921,171.

Clark, Julius. Apparatus for aligning pipe ends. 3,920,232, Cl. 269-25.000.

Clark, Raymond C., to Brunswick Corporation. Free flow sound attenuating device and method of using. 3,920,095, Cl. 181-42.000.

Clark, Robert Bruce. Seed feeding device for birds. 3,919,977, Cl. 119-18.000.

Clarke, Walter Wilson Hugh. Locking system. 3,921,040, Cl. 317-134.000.

Clarmere Limited: *See—*
Weinstein, Paul Alexander, 3,920,125.

Claverie, Claude, to Thomson-CSF. Wide dynamic range logarithmic amplifier arrangement. 3,921,008, Cl. 307-230.000.

Clavin, Edward A., to CRC-Crose International, Inc. Apparatus for positioning and clamping pipes for welding. 3,920,171, Cl. 228-44.000.

Clawson, Arthur H.; Ward, Robert J.; and Butler, Steven J., to P. R. Mallory & Co. Inc. Beam leaded device welding machine. 3,920,949, Cl. 219-85.000.

Clay, George F., to Turnbull Marine Design Company Limited. Rudder arrangements for ships. 3,919,962, Cl. 114-169.000.

Cleland, William Pettigrew; and Goldie, William Law, to British Steel Corporation. Materials handling device. 3,920,132, Cl. 214-6.0DS.

Clemens, James A.; Kornfeld, Edmund C.; and Bach, Nicholas J., to Eli Lilly and Company. D-2-halo-6-alkyl-8-substituted ergolines and related compounds. 3,920,664, Cl. 260-285.500.

Co-Operative Industries, Inc.: *See—*
Anderson, Franklin T., 3,920,269.

Coats & Clark, Inc.: *See—*
Einhorn, Ruediger, 3,920,210.

Coats, John H.: *See—*
Argoudelis, Alexander D.; Coats, John H.; and Sebek, Oldrich K., 3,920,522.

Coe Manufacturing Company, The: *See—*
Fields, Fred W., 3,919,954.

Cogswell, Frederic Neil, to Imperial Chemical Industries Limited. Sharkskin. 3,920,782, Cl. 264-98.000.

Cohen, Noal, to Hoffmann-La Roche Inc. Process for dehydrating vinyl-substituted tertiary alcohols. 3,920,749, Cl. 260-586.00R.

Colburn, Edward N.; and Markfelt, Reinhold S., to Universal Oil Products Company. Apparatus for making cylindrical screens. 3,920,170, Cl. 228-5.100.

Coleman, Herbert C.: *See—*
Martin, Daniel T.; Serrell, Morton A.; Coleman, Herbert C.; Cooper, Donald L.; Knox, Robert M.; Barnfield, Curtis L.; and Walinchus, Robert J., 3,920,967.

Colgate-Palmolive Company: *See—*
Grecsek, John Jerome, 3,920,564.
Karami, Hamzeh, 3,920,017.
Schaar, Charles H., 3,920,018.
Schaar, Charles H., 3,920,019.
Wixon, Harold Eugene, 3,920,563.

Collins, Anna M.: *See—*
Vigo, Tyrone L.; Welch, Clark M.; and Collins, Anna M., 3,920,391.

Collins, Dwight Dixon, to Chemsoil Corporation. Removal of oxides of nitrogen from gas streams which also contain sulfur dioxide. 3,920,421, Cl. 55-73.000.

Colombo, Luigi: *See—*
Ceccato, Giovanni; Geri, Sergio; and Colombo, Luigi, 3,920,620.

Colorado Time Systems, Inc.: *See—*
Brown, David F.; and Urban, Harold C., 3,920,940.

Colson Company, The: *See—*
Downing, Joe R., 3,920,260.

Columbine Glass Company: *See—*
Fogelberg, Clement V.; and Kujave, John M., 3,920,433.

Comas, Enrique G.; and Emler, Michael G., to Stromberg-Carlson Corporation. Receiver for pulse width modulated signals. 3,921,009, Cl. 307-234.000.

Combustion Engineering, Inc.: *See—*
Calvin, John Norman, 3,920,514.
Fernandes, John Henry, 3,920,417.

Commissariat A L'Energie Atomique & Agence Nationale De Valorisation De La Recherche Anvar: *See—*
Dubois, Jacques Emile; Lacaze, Pierre Camille; Le Gressus, Claude; and Massignon, Daniel, 3,921,031.

Communications Patents Limited: *See—*
Gargini, Eric John, 3,920,906.

**Compagnie de Signaux et d'Entreprises Electriques:** *See—*
Daguillon, Claude, 3,920,316.

**Compagnie Francaise D'Etudes et de Construction Technip:** *See—*
Denis, Louis H., 3,919,854.

**Compagnie Generale de Radiologie:** *See—*
Munch, Joseph, 3,920,997.

**Compagnie Industrielle des Telecommuncations Cit-Alcatel:** *See—*
Roy, Marie-Annick, 3,920,917.

**Compagnie Industrielle des Telecommunications Cit-Alcatel:** *See—*
Aillet, Claude, 3,920,919.

**Computer Sciences Corporation:** *See—*
Houston, Randie M.; and Wilson, Harold G., Jr., 3,921,140.

**Conder International Limited:** *See—*
Alabaster, Leonard Frederick Peter, 3,919,815.

**Connelly, Lawrence J.:** *See—*
Hurlock, John R.; Ballweber, Edward G.; and Connelly, Lawrence J., 3,920,599.

**Connor, David T.;** and von Strandtmann, Maximilian, to Warner-Lambert Company. Process for the cyclization of aryl(methylsulfinyl)-methyl ketones and compounds produced thereby. 3,920,699, Cl. 260-326.110.

**Connor, Denis John,** to Bell Telephone Laboratories, Incorporated. Method and apparatus for crispening video signals by the use of temporal filters. 3,920,889, Cl. 178-6.800.

**Consolidation Coal Company:** *See—*
Jamison, Will B.; and Coval, Arthur B., 3,920,039.
Rice, Charles H., 3,920,418.

**Constable, Ronald Jack Walker,** to Hirst Microwave Industries Limited. Method of cooking food employing both microwave and heat energy. 3,920,944, Cl. 219-10.55M.

**Construction Materials Division General Electric Company:** *See—*
Caltagirone, Saverio, 3,921,115.

**Continental Can Company, Inc.:** *See—*
Radlove, Sol B., 3,920,732.

**Continental Oil Company:** *See—*
Leach, Bruce E.; and Hritz, George G., 3,920,867.
Miller, Dale E., 3,921,061.
Payton, Charles E., 3,921,124.
Waters, Kenneth H., 3,921,126.

**Contreras, Agripin.** Ball Target Game. 3,920,246, Cl. 273-127.00R.

**Cook, Edward H., Jr.;** and Emery, Alvin T., to Hooker Chemicals & Plastics Corporation. Electrolytic method for the manufacture of dithionites. 3,920,551, Cl. 204-92.000.

**Cook, Edward H., Jr.:** *See—*
Schultz, Robert F.; and Cook, Edward H., Jr., 3,920,535.

**Cook, Elton S.;** Tanaka, Kinji; and Fujii, Akira, to Stanley Drug Products, Inc. Antifibrinolytic agents. 3,920,833, Cl. 424-303.000.

**Cook, Robert Dale:** *See—*
Hirzel, Edgar A.; and Cook, Robert Dale, 3,920,278.

**Coone, Malcolm G.;** and Miller, Stanley D., to Lynes, Inc. Structure and method of positioning for use in water covered areas. 3,919,850, Cl. 61-46.500.

**Cooper, Donald L.:** *See—*
Martin, Daniel T.; Serrell, Morton A.; Coleman, Herbert C.; Cooper, Donald L.; Knox, Robert M.; Barnfield, Curtis L.; and Walinchus, Robert J., 3,920,967.

**Cornell, Alan:** *See—*
Middendorf, John Edward; Waggle, Doyle Hans; and Cornell, Alan, 3,920,853.

**Corning Glass Works:** *See—*
Flannery, James E.; and Wexell, Dale R., 3,920,462.
Gigliello, Joseph F.; and Kragle, Harry A., 3,920,549.

**Corwin, Merton Dudley, Jr.;** Hohn, Richard Edward; and Tarvin, Ronald Lee, to Cincinnati Milacron Inc. Method and apparatus for programming a computer operated robot arm. 3,920,972, Cl. 235-151.110.

**Cosme, Peter A.:** *See—*
Holtzman, Samuel J.; and Cosme, Peter A., 3,920,408.

**Coulter Electronics, Inc.:** *See—*
Pontigny, Jacques A., 3,921,006.

**Coulter, Geoffrey Lionel:** *See—*
Japp, Michael Peter; and Coulter, Geoffrey Lionel, 3,920,061.

**Coval, Arthur B.:** *See—*
Jamison, Will B.; and Coval, Arthur B., 3,920,039.

**Cover, Richard James:** *See—*
Bell, John Ray; and Cover, Richard James, 3,920,051.

**Cox, William G., III,** to Thompson, Harold C. Water ski rope rewinder. 3,919,963, Cl. 114-235.0WS.

**Craggs, Joseph,** to Peabody Coal Company. Monorail supported flexible frame endless conveyor. 3,920,115, Cl. 198-109.000.

**Crandall, Robert E.,** to Envirex Inc. Swing pipe assembly for removable gas diffuser. 3,920,186, Cl. 239-280.500.

**Crane Co.:** *See—*
Hirzel, Edgar A.; and Cook, Robert Dale, 3,920,278.

**CRC-Crose International, Inc.:** *See—*
Clavin, Edward A., 3,920,171.

**Crippa, Giovanni:** *See—*
Beretta, Achille; and Crippa, Giovanni, 3,919,814.

**Crocker, Richard E.,** to Chevron Research Company. Grease composition and method of preparing the same. 3,920,571, Cl. 252-25.000.

**Croft, Gregory E.:** *See—*
Wampfler, Gene L.; and Croft, Gregory E., 3,920,735.

**Crompton & Knowles Corporation:** *See—*
Nelson, Howard I., 3,920,052.

**Crooke, Robert C.:** *See—*
Graham, John R.; and Crooke, Robert C., 3,919,958.

**Cropp, David I.** Straightening device. 3,920,055, Cl. 140-147.000.

**Crouzet, Paul:** *See—*
Vandrebeck, Roger; Crouzet, Paul; and Sourbet, Claude, 3,920,142.

**Crown Zellerbach Corporation:** *See—*
Allen, Barrington T., 3,920,459.
Yonemori, Hayato, 3,920,507.
Yonemori, Hayato, 3,920,508.

**Cryder, Albert H.:** *See—*
Shattuck, Richard E.; and Cryder, Albert H., 3,920,114.

**Cunningham, Michael Paul;** Farley, William Charles; and Van Hanehem, Richard Cornelius, to Eastman Kodak Company. Photographic leuco-dye compositions containing reductones as stabilizers. 3,920,457, Cl. 96-90.00R.

**Cuntze, Gerhard:** *See—*
Berg, Gerhard; Nordsiek, Karl-Heinz; Sommer, Neithart; Barnstedt, Egge; and Cuntze, Gerhard, 3,920,604.

**Currie, John M.,** to International Navigation Corporation. Method of and apparatus for locating predetermined portions of a radio-frequency pulse, particularly adapted for leading edge location of loran and similar navigational pulses. 3,921,076, Cl. 325-321.000.

**Curry, Kenneth Vasey;** and Sahir, Ahamado Ismail, to Lever Brothers Company. Antiperspirant and deodorant compositions. 3,920,807, Cl. 424-46.000.

**Curtis, Daniel B.:** *See—*
Aepli, Otto T.; Sorgenfrei, Malachy E.; and Curtis, Daniel B., 3,920,856.

**Curtis, Donald;** and Hooper, Anthony Martin, to James A. Jobling & Company Limited. Glass tube bending apparatus. 3,920,435, Cl. 65-281.000.

**Curtis, Mark T.:** *See—*
Blue, Steven C.; Curtis, Mark T.; Orthwein, William C.; and Stitt, Daniel H., 3,920,343.

**Curtis, Orson R.:** *See—*
Berry, Clifford M.; and Curtis, Orson R., 3,920,221.

**Curtiss-Wright Corporation:** *See—*
Jones, Charles, 3,920,412.

**Cutchaw, Johh M.** Zero insertion force solderless connector. 3,920,302, Cl. 339-75.0MP.

**Cutler, Alvin H.** Magnetic fastener. 3,919,743, Cl. 24-201.00B.

**Cutter Laboratories, Inc.:** *See—*
Lund, Lloyd J., 3,920,811.

**Cyprus Mines Corporation:** *See—*
Harris, Dwight L., 3,920,800.

**Czaplinski, Thomas V.;** Bolter, Bernard J.; Heyer, Robert E.; and Bruno, Gerald A., to E. R. Squibb & Sons, Inc. Radioactive material generator. 3,920,995, Cl. 250-432.000.

**Daguillon, Claude,** to Compagnie de Signaux et d'Entreprises Electriques. Electronic contour follower. 3,920,316, Cl. 250-202.000.

**Dahl, Warren F.,** to Standard Pressed Steel Co. Fastener assembly for preloading a joint. 3,920,338, Cl. 403-19.000.

**Daicel Ltd.:** *See—*
Kubo, Masayoshi; Nakazawa, Yuji; and Takahashi, Katuhiko, 3,920,708.

**Daimler-Benz Aktiengesellschaft:** *See—*
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**Daley, James M.:** *See—*
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**Damiano, John,** to Quigley Co., Inc. Refractory bonding system. 3,920,464, Cl. 106-58.000.

**Damon Corporation:** *See—*
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**Damschroder, Rudolph E.;** and Hughes, Donald J., to Eastman Kodak Company. Process by which at least one stripe of one material is incorporated in a layer of another material. 3,920,862, Cl. 427-131.000.

**Danco, William J.,** to General Electric Company. Programmable data processor and controller system. 3,921,146, Cl. 340-172.500.

**Dancsik, Joseph J.** Three dimensional cutting machine with pantograph control. 3,919,919, Cl. 90-13.100.

**Danfoss A/S:** *See—*
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**Daniels, Peter J. L.,** to Schering Corporation. 2''-Deoxyaminoglycosides and 2''-epi-amino-3''-desamino derivatives thereof, methods for their manufacture and novel intermediates useful therein. 3,920,628, Cl. 260-210.0AB.

**Danjushevsky, Solomon Isaakovich;** Liogonkaya, Rakhil Izrailevna; and Sudakas, Lev Girshovich. Binder for cementing wells. 3,920,466, Cl. 106-117.000.

**Dann, Bert H.;** and Guisinger, Barrett E., to International Video Corporation. Videotape recorder and reproducer velocity compensator apparatus. 3,921,202, Cl. 358-8.000.

**Danner, Max;** Krieg, Martin; and Matschke, Klaus, to Hoechst Aktiengesellschaft. Process for the preparation of aluminium hydroxy halide powders. 3,920,406, Cl. 23-293.00A.

**Darling, Myron E.** Musical instrument bow frog. 3,919,912, Cl. 84-282.000.

**Darmara, Falih N.:** *See—*
Soykan, Ferhun H.; Huntington, John S.; and Darmara, Falih N., 3,920,062.

**Dart Industries Inc.:** *See—*
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**Datsko, George:** *See—*
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Davies, Terrence Ardern, to Square D Company. Light-duty electrical contacts. 3,920,452, Cl. 75-200.000.

Davis, George Bradley, Jr. Joist, structural element and devices used in making same. 3,919,824, Cl. 52-689.000.

Davis, Lester M., to Les Davis Fishing Tackle Co. Process of making a fishing lure and the product thereof. 3,919,802, Cl. 43-42.500.

Davis, Philip E., Jr. Adjustable mixing device. 3,920,227, Cl. 259-96.000.

Dawson, Daniel J.; and Rudinger, Josef, to Dynapol. Food containing non-toxic food coloring compositions and a process therefor. 3,920,855, Cl. 426-250.000.

Day, Fredrick M. Snap-in arrow rest. 3,919,997, Cl. 124-41.00A.

Day, Ian Harold; and Carmichael-Drage, John, to Polymark Corporation. Method of applying heat-sealable marking labels for flexible articles. 3,920,499, Cl. 156-240.000.

Day, Robert L.: *See—*
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Dayco Corporation: *See—*
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Dean, Raymond Harkless, to RCA Corporation. Method of making a semiconductor device. 3,920,861, Cl. 427-88.000.

DeCaro, Charles J., to Textron Inc. Driving tool mechanism. 3,920,169, Cl. 227-136.000.

Dechavanne, Jacques. Dynamic seal for double-acting piston. 3,920,252, Cl. 277-188.000.

Decker, Bert J. Horizontal hinged-flap windmill. 3,920,354, Cl. 416-117.000.

DeCotiis, C. John: *See—*
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Deering Milliken Research Corporation: *See—*
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De Gaudemaris, Gabriel: *See—*
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Dell Holdings Limited: *See—*
Elias, Murray A., 3,920,220.

del Rio, Marija; Behnke, Joachim; Wallrabenstein, Michael; and Frank, Dieter, to Akzona Incorporated. Polyacyl-dihydrazino-s-triazines and their preparation. 3,920,611, Cl. 260-47.0CP.

De Luca, Paul V., to Porta Systems Corporation. Cutover transition switching apparatus and method for telephone office equipment. 3,920,927, Cl. 179-98.000.

DeMaria, Anthony J.: *See—*
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Demay, Gerard. Linear roller bearing. 3,920,289, Cl. 308-6.00C.

Demny, Werner; and Moeltner, Hermann, to Friedrich Kocks, Firma. Methods and apparatus for tube rolling. 3,919,872, Cl. 72-205.000.

Demole, Edouard P., to Firmenich S.A. Flavored tobacco product. 3,920,027, Cl. 131-17.00R.

Dempsey, James J.; and Smith, Drexel Kermit, to Du Pont de Nemours, E. I., and Company. Softened fibrillated sheet. 3,920,874, Cl. 428-198.000.

Denis, Louis H., to Compagnie Francaise D'Etudes et de Construction Technip. Gas sealing assembly. 3,919,854, Cl. 62-37.000.

Dennie, Richard H.; and Stanley, Michael R., to Xerox Corporation. Background removal apparatus. 3,920,329, Cl. 355-15.000.

Denny, Robert B., to Adar, Inc. Radio teletype detector circuit. 3,921,075, Cl. 325-320.000.

De Rugeris, John. Carburetor apparatus having an improved fuel metering arrangement. 3,920,778, Cl. 261-39.00D.

Desai, Nalin Binduprasad; and Jenny, Walter, to Ciba-Geigy AG. Water-insoluble styryl dyestuffs. 3,920,719, Cl. 260-465.00D.

Descamps, Marcel; Gubin, Jean; and Claeys, Norbert, to Labaz. Certain 3-substituted amino alkoxy benzoyl-2-lower alkyl or 2-cycloalkyl benzofurans. 3,920,707, Cl. 260-346.20R.

DesMarais, Thomas Allen, to Procter & Gamble Company, The. Composition for imparting softness and soil release properties to fabrics. 3,920,561, Cl. 252-8.800.

Dettke, Manfred; and Roosen, Manfred, to Schering AG. Self-regulating plating bath and method for electrodepositing chromium. 3,920,527, Cl. 204-51.000.

Deuterium Corporation: *See—*
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Deutsch, Albert S.; and Poppo, Joseph M., to Polychrome Corporation. Light-sensitive compositions and materials with O-naphthoquinone diazide sulfonyl esters. 3,920,455, Cl. 96-75.000.

Deutsche Babcock & Wilcox A.G.: *See—*
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Laufer, Siegmar; and Roy, Waldemar, 3,920,865.
vonBebenburg, Walter; and Offermanns, Heribert, 3,920,633.

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Diagnostic Instruments, Inc.: *See—*
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Diamond, Arthur D. Electrosensitive recording media. 3,920,873, Cl. 428-195.000.

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Dictaphone Corporation: *See—*
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Diebel, Klaus; and Birkner, Helmut, to Chemische Werke Huels, A.G. Nonflammable molding compositions of styrene polymers. 3,920,606, Cl. 260-45.70R.

Diebold, Vincent B.: *See—*
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Diehl, Robert Eugene: *See—*
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Dietrich, Johann: *See—*
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Dietz, Wolfgang Friedrich Wilhelm, to RCA Corporation. Alternating current line voltage supply isolation using deflection system output transformer. 3,920,892, Cl. 178-7.30R.

Dietze, Wolfgang: *See—*
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Dimitraschuk, Valentin Trofimovich: *See—*
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Dionics, Incorporated: *See—*
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Director-General of the Agency of Industrial Science and Technology: *See—*
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Ditz-Crane: *See—*
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Dixon, William D.: *See—*
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Djinnii Industries, Inc.: *See—*
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DMZ "LENNIN": *See—*
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Dobson, William C.; and Straughn, James W., to Dart Industries Inc. Electric coffee maker with a thermostat and heat sink control. 3,920,954, Cl. 219-441.000.

Doby, William P.; and Maxwell, Albert H., Jr., to Westinghouse Electric Corporation. Outage indicating apparatus for meter telemetry systems including data recorders. 3,921,207, Cl. 360-6.000.

Dr. L. Zambeletti S.p.A.: *See—*
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Dodds, Robert B.: *See—*
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Doig, Kingsley Ferguson: *See—*
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Pittie, Willem Hubert; Overbeek, Gerhardus; and Doig, Kingsley Ferguson, 3,920,790.

Dokunikhin, Nikolai Stepanovich; and Vorozhtsov, Georgy Nikolaevich. Dinaphthyl derivatives, method of producing same and application thereof. 3,920,387, Cl. 8-34.000.

Dolby Laboratories, Inc.: *See—*
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Dolfini, Joseph Edward, to E. R. Squibb & Sons, Inc. Cyanomethylthioacetyl-7-methoxycephalosporins. 3,920,639, Cl. 260-243.00C.

Dolfsma, H., to SKF Industrial Trading and Development Company B.V. Flexible coupling. 3,919,860, Cl. 64-14.000.

Donnelly, Thomas L.; and Mullen, Edward J., to Xerox Corporation. Duplex fusing apparatus and method. 3,920,952, Cl. 219-216.000.

Doolittle, Howard D.: *See—*
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Doring, Fritz: *See—*
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Dorr-Oliver Incorporated: *See—*
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Dorsey, William Franklin, to Union Carbide Corporation. Welding power supply having dual output transformer. 3,921,055, Cl. 321-24.000.

Douglas, Stuart M. Self-tightening door lock. 3,920,110, Cl. 292-207.000.

Dow Chemical Company, The: *See—*
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Dowa Mining Co., Ltd., The: *See—*
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Dowdy, Leroy D.; and Ray, Basil D. Pipe clamp employing electrolytic corrosion and noise preventive means. 3,920,208, Cl. 248-56.000.

Downing, Joe R., to Colson Company, The. Cart shelf supporting structure. 3,920,260, Cl. 280-79.300.

Doyle, Charles D.: *See—*
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Dragoco Spezialfabrik konz, Riech-und Aromastoffe Gerberding & Co. GmbH: *See—*
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Dravo Corporation: *See—*
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Dresser Industries, Inc.: *See—*
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Mitchell, Howard Earl, 3,920,089.
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Drewe, Nigel Wyndham; Waters, Alan Cecil; and Giffard, Peter Ernest, to Imperial Chemical Industries Limited. Herbicidal compositions. 3,920,443, Cl. 71-94.000.

Drexler, Gunter; Panzer, Werner; and Schofer, Hans, to Gesellschaft fuer Strahlen- und Umweltforachung mbH Muenchen. X-Ray source. 3,920,999, Cl. 250-493.000.

Dronova, Lidia Mikhailovna: *See—*
Goppen, Albert Adolfovich; Nikolaer, Igor Vladimirovich; Dronova, Lidia Mikhailovna; and Lednikov, Anatoly Ivanovich, 3,920,086.

Druin, Melvin L.; Loft, John T.; and Plovan, Steven G., to Celanese Corporation. Process for increasing the porosity of opencelled microporous film. 3,920,785, Cl. 264-210.00R.

Dubois, Jacques Emile; Lacaze, Pierre Camille; Le Gressus, Claude; and Massignon, Daniel, to Commissariat A L'Energie Atomique & Agence Nationale De Valorisation De La Recherche Anvar. Electroemissive component. 3,921,031, Cl. 315-94.000.

Duc, Xuong Nguyen: *See—*
Castela, Andre; Susbielles, Gilles; and Duc, Xuong Nguyen, 3,920,378.

Dudek, Edmund C., to Thor Power Tool Company. Power tool with torque sensing control means. 3,920,082, Cl. 173-12.000.

Dudek, Edmund C., to Thor Power Tool Company. Power tool with continuous and pulsating torque output cycle. 3,920,088, Cl. 173-169.000.

Dunbar, Robert A., to Damon Corporation. Remote sensing and control system. 3,921,168, Cl. 340-408.000.

Duncan, Lloyd P. Milker unit. 3,919,975, Cl. 119-14.050.

Dundore, Mark B. Drafting machine. 3,919,778, Cl. 33-80.000.

Dunkel, Morris: *See—*
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Dunn, Roland J., Jr.: *See—*
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Dunphy, Lawrence Cyril. Vending of articles. 3,920,100, Cl. 186-1.00A.

Dupon, Michel, to Fermeture Ailee S.A. System for assembling two parts and a sliding fastener slider including application thereof. 3,919,745, Cl. 24-205.14R.

Du Pont de Nemours, E. I., and Company: *See—*
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Durant, Graham John; Emmett, John Colin; and Ganellin, Charon Robin, to Smith Kline & French Laboratories Limited. Inhibition of histamine activity with cyanoguanidines. 3,920,822, Cl. 424-263.000.

DuVernay, Arthur C., to Auto-Craft Tool & Die Company. Method and crimping tool for permanently joining together two sheet metal members. 3,919,955, Cl. 113-1.00N.

Duzy, Josef: *See—*
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Dvoichenkova, Elza Alexandrovna: *See—*
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Dye, John F.; Binard, William J.; and Patel, Bhupendra C., to Kendall Company, The. Fluid sampling and measuring apparatus. 3,920,002, Cl. 128-2.00R.

Dye, John F.; and Binard, William J., to Kendall Company, The. Method and apparatus for placement of a suprapubic catheter. 3,920,023, Cl. 128-347.000.

Dyer, Norman D.: *See—*
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Dykstra, Gerald M.; and Hollingsworth, Rabon L., to Central Soya Company, Inc. Method for producing paper coating binder involving grafting unsaturated acrylate monomers onto proteinaceous substrate in water. 3,920,592, Cl. 260-8.000.

Dym, Herbert, to International Business Machines Corporation. High resolution graphic data tablet. 3,921,165, Cl. 340-347.0NT.

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Eanzel, Albert Robert, to Du Pont de Nemours, E. I., and Company. Textile cleaning process. 3,920,389, Cl. 8-142.000.

Earhart, Ruth. Lap robe. 3,919,721, Cl. 2-69.000.

Early, Edward W., to United States of America, Navy. Torpedo target simulator. 3,921,123, Cl. 340-3.00E.

Eastern Electronics (Norwich) Limited: *See—*
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Eckert, William S.: *See—*
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Eckett, David Vivian; and Ellen, Christopher Hillary, to United Glass, Ltd. Method for producing a three layer coating on a glass container and the resulting article. 3,920,869, Cl. 428-35.000.

Eckhardt, Hellmuth, to Torrington GmbH. Journal bearing. 3,920,296, Cl. 308-212.000.

Ecsery, Zoltan; Hermann nee Voros, Judit; Voros, Nee; Torok, Zoltan; and Dvorcsak, Peter, to Chinoin Gyogyszer- Es Vegyeszeti Termekek Gyara Rt. Quaternary ammonium compounds. 3,920,651, Cl. 260-256.40N.

Edamura, Fred Y.; and Sbragia, Ronald J., to Dow Chemical Company, The. Methyl-(4-methylphenyl)-substituted-tetra-zolo(1,5-a)pyrimidine. 3,920,654, Cl. 260-256.40F.

Edgar Pickering (Blackburn) Limited: *See—*
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Edgett, Clifford T., to Inventors Engineering, Inc. Part Loader. 3,920,130, Cl. 214-1.0BD.

Edholm, Paul Ragnvald; and Jacobson, Nils Bertil, to Medinova AB of Sweden. Screening or aperture device for an x-ray apparatus. 3,921,001, Cl. 250-510.000.

Edwards, Donald W. Aspirator device. 3,920,001, Cl. 128-2.00F.

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Ege, Guenter, to BASF Aktiengesellschaft. Production of 3-aminopyrazoles. 3,920,693, Cl. 260-310.00R.

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Eilrich, Gary L.; and Dixon, William D., to Monsanto Company. 2-Imino derivatives of substituted imidazoles. 3,920,688, Cl. 260-309.600.

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Eisai Co., Ltd.: *See—*
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Eisele, Max; and Wilhelm, Gunter, to Siemens Aktiengesellschaft. Improved liquid cooled semiconductor disk arrangement. 3,921,201, Cl. 357-82.000.

Eisenwerk-Gesellschaft Maximilianshutte mbH: *See—*
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Ekimovskikh, Ivan Alexandrovich; and Ignatov, Boris Grigorievich. VHF-band pulse radiospectrometer for the study of nuclear quadrupole resonance in solid specimens. 3,921,060, Cl. 324-0.50A.

Eklund, Phillip R. High pressure shaft seal structure. 3,920,250, Cl. 277-51.000.

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VandenBerg, Willard J.; Ramsey, Robert E.; Pieczko, George; Bollman, Robert L.; and Krackenberger, Richard E., 3,920,541.

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Elkern, Kenneth F., to Elkern, Kenneth F., Jr.; and Elkern, Pamela K. Self-contained water treatment system. 3,920,552, Cl. 210-141.000.

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Elkern, Pamela K.: *See—*
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Ell, Robert J.; and Knight, Frank W., Jr. Photographic processing fluid applicator. 3,921,190, Cl. 354-317.000.

Ellen, Christopher Hillary: *See—*
Eckett, David Vivian; and Ellen, Christopher Hillary, 3,920,869.

Ellingsen, Svein; and McLean, Allan D., to Paccal Inc. Torsion bar steerable bogie suspension. 3,920,261, Cl. 280-81.500.

Ellis, Donovan K.; and Ryan, William P., to Lumi-Tek, Inc. Projector for front projection photography. 3,920,320, Cl. 352-89.000.

ELMEG Elektro-Mechanik GmbH: *See—*
Reuting, Hans-Werner; Wahnschaffe, Klaus-Dieter; and Eggers, Hugo, 3,921,107.

Elmore, Lester C.: *See—*
Broxholm, Thomas M.; and Elmore, Lester C., 3,919,922.

Elting, Katherine Anne Cline, to Milchem Incorporated. Composition and process for defoaming aqueous drilling fluids. 3,920,559, Cl. 252-8.50C.

Eltra Corporation: *See—*
Hansen, Walter; Harris, Joel S.; and Klepper, Herbert, 3,921,182.
Horvath, Sandor J., 3,921,197.

Ely, William E., to B. F. Goodrich Company, The. Friction disc member for brake or clutch. 3,920,108, Cl. 192-107.00R.

Emenaker, Leo Joseph: *See—*
Barrus, Gordon Brent; Emenaker, Leo Joseph; and Melissa, Raymond Franklin, 3,919,936.

Emery, Alvin T.: *See—*
Cook, Edward H., Jr.; and Emery, Alvin T., 3,920,551.

Emler, Michael G.: *See—*
Comas, Enrique G.; and Emler, Michael G., 3,921,009.

Emm, Michael Gene; and Kim, Dongsung Robert, to Burroughs Corporation. Multirequest grouping computer interface. 3,921,145, Cl. 340-172.500.

Emmett, John Colin: *See—*
Durant, Graham John; Emmett, John Colin; and Ganellin, Charon Robin, 3,920,822.

Endo, Masanori; and Miyagi, Ken, to Tohoku Metal Industries Limited. Temperature control apparatus. 3,920,956, Cl. 219-503.000.

Endo, Tomio: *See—*
Shimada, Fumitake; Ikekawa, Tetsuro; Tachibana, Kooichi; Endo, Tomio; Kohno, Tetsuo; Kuroda, Hideo; Ikeda, Yoshiaki; Okazaki, Yoshimi; and Sawa, Yoshio, 3,920,665.

Endo, Toshiaki; Takao, Masateru; Abe, Nobuhiro; Wakita, Shuhei; and Kamata, Haruo, to Nissan Motor Company, Limited. Automotive bumper arrangement. 3,920,111, Cl. 293-97.000.

Endres, Joseph G.: *See—*
Barker, Thomas G.; Young, Larry L.; and Endres, Joseph G., 3,920,857.

Engel, Wolfhard: *See—*
Nickl, Josef; Teufel, Helmut; Engel, Wolfhard; Seeger, Ernst; and Engelhardt, Gunther, 3,920,668.

Engeler, William E.; and Tiemann, Jerome J., to General Electric Company. Method and apparatus for storing and transferring information. 3,921,194, Cl. 357-24.000.

Engelhardt, Gunther: *See—*
Nickl, Josef; Teufel, Helmut; Engel, Wolfhard; Seeger, Ernst; and Engelhardt, Gunther, 3,920,668.

Entreprise De Recherches et D'Activities Petrolieres Elf: *See—*
Valentin, Patrick; and Hagenbach, Germain, 3,920,420.

Envirex Inc.: *See—*
Crandall, Robert E., 3,920,186.

Environment/One Corporation: *See—*
Farrell, R. Paul, Jr.; and Setser, James L., 3,920,550.

Erhardt, Klaus: *See—*
Petersen, Harro; Erhardt, Klaus; Ruemens, Wilhelm; and Bille, Heinz, 3,920,390.

Erickson, Robert L.; and Smith, David P., to Minnesota Mining and Manufacturing Company. Ion scattering spectrometer utilizing charge exchange processes. 3,920,989, Cl. 250-307.000.

Erie Industrial Insulation Corporation: *See—*
Price, Sidney M., 3,920,188.

Eror, Nicholas G.; Burn, Ian; and Maher, Galeb H., to Sprague Electric Company. Method of forming a ceramic dielectric body. 3,920,781, Cl. 264-61.000.

Esaki, Tamemaru: *See—*
Nakagawa, Junyo; Ohno, Yoshikata; Esaki, Tamemaru; and Ueda, Keizo, 3,920,784.

Escher Wyss Limited: *See—*
Lehmann, Rolf; and Lehmann, Helmuth, 3,919,753.

Esco Corporation: *See—*
Hahn, Frederick C.; and Jones, Larren F., 3,919,792.

Eskeli, Michael. Dual fluid single rotor turbine. 3,919,845, Cl. 60-643.000.

Esquire, Inc.: *See—*
Holmes, Kenneth P., 3,921,035.

Estep, James W.; and Plum, Edward W., to Texasgulf Inc. Liquid sulphur gas scrubber apparatus. 3,920,424, Cl. 55-193.000.

Etablissements Genoud & Cie Societe Anonyme: *See—*
Neyret, Guy, 3,920,379.

Ethyl Corporation: *See—*
Kinsley, Homan B., Jr., 3,920,428.

Eue, Ludwig: *See—*
Wagner, Klaus; Eue, Ludwig; and Klauke, Erich, 3,920,445.
Wenzelburger, Jurgen; Jager, Gerhard; Eue, Ludwig; and Schmidt, Robert R., 3,920,653.

Eugen Beyer Elektrotechnische Fabrik: *See—*
Blauert, Jens; and Laws, Peter, 3,920,904.

Evans, John L.; DeCotiis, C. John; and Johnson, Victor P., to Singer Company, The. Projectile having a gyroscope. 3,920,200, Cl. 244-3.160.

Evarts, Kingsley S., to J & M Hydraulic Servic, Inc. Ball transfer unit. 3,920,290, Cl. 308-6.00R.

Everhardt, William F.; and Brown, Henry L., Jr., to American Power Tread Corporation. Method and apparatus for retreading pneumatic tires. 3,920,498, Cl. 156-96.000.

Exxon Research & Engineering Co.: *See—*
Hamner, Glen P.; and Sawyer, Willard H., 3,920,539.
Miller, Alfred H., 3,920,567.
Shaub, Harold; and Garbus, Adolph J., 3,920,568.
Song, Won R.; and Jacobson, Norman, 3,920,622.
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Fachinetti, Giuseppe: *See—*
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Facit Aktiebolag: *See—*
Stenudd, Sven Gunnar Valter, 3,920,958.

Fairchild Camera and Instrument Corporation: *See—*
Hu, Daniel C., 3,920,481.

Faller, Rudolph A., to Hoerner Waldorf Corporation. Apparatus for forming visual display packages. 3,920,371, Cl. 425-388.000.

Fannin, Wayne V., to General Motors Corporation. Telescoping energy absorbing unit. 3,920,274, Cl. 293-70.000.

Fariss, Robert H.; and Snelgrove, James A., to Monsanto Company. Plasticized polyvinyl butyral interlayers. 3,920,878, Cl. 428-437.000.

Farley, William Charles: *See—*
Cunningham, Michael Paul; Farley, William Charles; and Van Hanehem, Richard Cornelius, 3,920,457.

Farrell, R. Paul, Jr.; and Setser, James L., to Environment/One Corporation. Process and equipment for automatic chemical-biological wastewater treatment with provisions for recycle and reuse. 3,920,550, Cl. 210-86.000.

Fassauer, Arthur L., to Fassauer Industries, Inc. Particulate material feeder. 3,920,224, Cl. 259-8.000.

Fassauer Industries, Inc.: *See—*
Fassauer, Arthur L., 3,920,224.

Fassbinder, Hans Georg: *See—*
Knuppel, Helmut; Brotzmann, Karl; and Fassbinder, Hans Georg, 3,920,448.

Fassell, W. Martin; and Bridges, Donald W., to Barber-Colman Company. Wet oxidation process for waste material. 3,920,548, Cl. 210-63.000.

Featherstone, Thomas W.: *See—*
Carlton, Robert D.; Chamberlin, Davis W.; and Featherstone, Thomas W., 3,920,501.

Fechtig, Bruno: *See—*
Bickel, Hans; Bosshardt, Rolf, deceased; Fechtig, Bruno; Mueller, Johannes; and Peter, Heinrich, 3,920,638.

Fedders Corporation: *See—*
Kloos, William W.; Osterkorn, Charles L.; and Marino, Salvatore M., 3,920,887.

Feichtinger, Hans; Noeske, Heinz; and Birnkraut, Hans-Walter, to Ruhrchemie Aktiengesellschaft. Process for the production of alkoxides of magnesium and aluminum. 3,920,713, Cl. 260-448.0AD.

Feinland, Raymond; Iscowitz, Sigmund; and Bil, Milos S., to Clairol Incorporated. Autoxidizable hair dye containing preparations. 3,920,384, Cl. 8-10.200.

Fenne, Ivor: *See*—
Jarrett, Boaz Antony; and Fenne, Ivor, 3,919,989.

Fennell, John Richard: *See*—
Harvey, Robert Joseph; and Fennell, John Richard, 3,920,815.

Ferchland, Harold W., to General Motors Corporation. Milling cutter. 3,919,752, Cl. 29-103.00R.

Fermeture Ailee S.A.: *See*—
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Fernandes, John Henry, to Combustion Engineering, Inc. Method of gasifying carbonaceous material. 3,920,417, Cl. 48-197.00R.

Fernstrom, Henry C., to Barrett Electronics Corporation. Electrical power supply arrangement for a guided stock selector truck. 3,920,105, Cl. 191-22.00R.

Ferrando, Juan Vilarrubis. Diving valves and regulators. 3,920,033, Cl. 137-81.000.

Ferrari, Giorgio, to Simes S.p.A. Method for the extraction of lysergol and ergot alkaloids from plants of the ipomoea genus. 3,920,663, Cl. 260-285.500.

Ferrari, Harry M.; Miller, Douglas L.; and Tong, Long S., to Westinghouse Electric Corporation. Fuel assembly for a nuclear reactor. 3,920,515, Cl. 176-78.000.

Feucht, Peter, to Siemens Aktiengesellschaft. Direct-current isolation amplifier. 3,921,088, Cl. 330-10.000.

Fichtel & Sachs AG: *See*—
Limbacher, Bernhard, 3,920,107.

Fields, Fred W., to Coe Manufacturing Company, The. Apparatus and method for handling and processing green wood veneer in the manufacture of plywood. 3,919,954, Cl. 112-121.290.

Fies, William J., Jr., to Finnigan Corporation. Mass spectrometer system having synchronously programmable sensitivity. 3,920,986, Cl. 250-282.000.

Filminiature Systems, Inc.: *See*—
Wally, Joseph H., Jr., 3,920,333.

Fineman, Laurence Keith, to Post Office, The. Telecommunications receivers. 3,920,900, Cl. 178-69.50R.

Finnigan Corporation: *See*—
Fies, William J., Jr., 3,920,986.

Firmenich S.A.: *See*—
Demole, Edouard P., 3,920,027.
Flament, Ivon A., 3,920,647.

Fischer, Adolf, to Badische Anilin- & Soda-Fabrik Aktiengesellschaft. Selective herbicide compositions containing a substituted triazine derivative and a benzo-2-thia-1,3-diazinone-(4)-2,2-dioxide. 3,920,441, Cl. 71-91.000.

Fischer, Martin: *See*—
Wiersdorff, Walter Wielant; and Fischer, Martin, 3,920,692.

Fish, Robert C.: *See*—
Garland, Milton W.; and Fish, Robert C., 3,919,858.

Fisher, Allen E.: *See*—
Primosch, Herbert F.; and Fisher, Allen E., 3,921,220.

Fisher, Robert E., to Upright, Inc. Vertical hydraulic ram system for scissors assembly scaffold. 3,920,096, Cl. 182-63.000.

Fishman, Mark J. Combination endodontic apical sealer and crown post. 3,919,774, Cl. 32-15.000.

Flament, Ivon A., to Firmenich S.A. Certain cyclo-penta-pyrazines. 3,920,647, Cl. 260-250.0BC.

Flannery, James E.; and Wexell, Dale R., to Corning Glass Works. Thermally opacifiable glasses. 3,920,462, Cl. 106-52.000.

Flatt, Jean-Pierre; and Blackburn, George L. Amino acid therapy. 3,920,838, Cl. 424-319.000.

Flautt, Martin C.: *See*—
Wong, Robert; Flautt, Martin C.; and Haines, Richard M., 3,920,313.

Floriani, Carlo; and Fachinetti, Giuseppe, to Snamprogetti S.p.A. Process for the catalytic hydrogenation of unsaturated compounds and catalyst employable in such a process. 3,920,745, Cl. 260-683.900.

Fluidrive Engineering Company Limited: *See*—
Elderton, John, 3,919,844.

FMC Corporation: *See*—
Lindow, Carl E., 3,920,925.

Foehr, Edward G., to Chevron Research Company. Demulsified extended life functional fluid. 3,920,562, Cl. 252-32.70E.

Fogelberg, Clement V.; and Kujave, John M., to Columbine Glass Company. Apparatus and method for improved glassware coating. 3,920,433, Cl. 65-60.000.

Fontanella, Luigi; and Mariani, Luigi, to Gruppo Lepetit S.p.A. Tetrahydropyrrolo[1,2-a]pyrazine-1(2H),4(3H)-diones. 3,920,660, Cl. 260-250.0BC.

Foote Mineral Company: *See*—
Boryta, Daniel A., 3,920,803.

Forbro Design Corporation: *See*—
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Ford Motor Company: *See*—
Gandhi, Haren S.; Heintz, Walter K.; and Shelef, Mordecai, 3,920,404.
Gropp, Karl H., 3,920,041.
Harrison, Robert S.; Medrick, John D.; and Nowroski, Alvin P., 3,920,777.
Koppenaal, Theodore J.; and Sernka, Richard P., 3,920,490.

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Forsman, Nanna: *See*—
Anderson, Lars-Olov; Borg, Hakan Gunnar; Forsman, Nanna; Hanshoff, Gunnar; Lindroos, Goran; Miller-Andersson, Maggie; and Ehrenberg, Elisabeth Charlotte, 3,920,625.

Fortino, Frank J.; and Dodds, Robert B. Beverage dispensing apparatus and method. 3,920,149, Cl. 222-1.000.

Foster, George Hails, Jr.: *See*—
Barnett, Miles Edmond, Jr.; Foster, George Hails, Jr.; and Patton, George Allen, 3,920,306.

Foster, Lawrence H. Method for reconstituting frozen food. 3,920,859, Cl. 426-520.000.

Foster, Owell G. Motorcycle gearshift lever. 3,919,896, Cl. 74-474.000.

Fowell, Andrew J., to American Standard Inc. Low noise faucet. 3,920,043, Cl. 137-625.170.

Fowler, Vernon John: *See*—
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Fox, Jon Edward, to International Business Machines Corporation. Capacitive circuitboard. 3,921,167, Cl. 340-365.00C.

Fradin, David W.: *See*—
Chenausky, Peter P.; DeMaria, Anthony J.; Fradin, David W.; and Freiberg, Robert J., 3,921,096.

Fraik, Robert D., to Minnesota Mining and Manufacturing Company. Method of providing and developing hidden entries. 3,920,863, Cl. 427-145.000.

Frank, Dieter: *See*—
del Rio, Marija; Behnke, Joachim; Wallrabenstein, Michael; and Frank, Dieter, 3,920,611.

Frank, Eldon M. Method of mounting implement device on tractor. 3,920,138, Cl. 214-152.000.

Frank, Marshall E.: *See*—
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Franke, Albrecht: *See*—
Rohr, Wolfgang; Franke, Albrecht; Giertz, Hubert; and Amann, August, 3,920,829.

Frankenhauser, Georg, to Kraftwerk Union Aktiengesellschaft. Apparatus for cooling armature end turns. 3,921,018, Cl. 310-270.000.

Franklin, Robert C.: *See*—
Carter, Alan W.; and Franklin, Robert C., 3,921,047.

Frazelle, Ronald B.; and Fuller, Neal B., to PBR Company. Continuous modular shelving system. 3,919,950, Cl. 108-114.000.

Frech, Kenneth J.; and Spoerke, Roger W., to Goodyear Tire & Rubber Company, The. Inhibition of polymerization during the isomerization of olefins. 3,920,765, Cl. 260-683.200.

Fredriksen, Wilhelm. Cross-country type ski binding system. 3,920,257, Cl. 280-11.35B.

Freed, William T., to Celanese Corporation. Thermoplastic nylon molding resins. 3,920,602, Cl. 260-37.00N.

Freeman, Frank Hubert, to Sybron Corporation. Direct moldable implant material. 3,919,773, Cl. 32-10.00A.

Freeman, Harlan G.; Baxter, Gene F.; and Allan, George Graham, to Weyerhaeuser Company. Amine-modified condensation polymers and rapid curing adhesive compositions prepared therefrom. 3,920,613, Cl. 260-67.60R.

Freiberg, Robert J.: *See*—
Chenausky, Peter P.; DeMaria, Anthony J.; Fradin, David W.; and Freiberg, Robert J., 3,921,096.

Freller, Helmut; and Bauer, Brigitte, to Siemens Aktiengesellschaft. Method for producing mixed crystal layers from CdS and CdSe. 3,920,860, Cl. 427-87.000.

Frese, Albert: *See*—
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Frezzolini Electronics, Inc.: *See*—
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Frick Company: *See*—
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Friedman, Carl D.: *See*—
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Friedrich Kocks, Firma: *See*—
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Friedrichsfeld GmbH Steinzeug-und Kunstostoffwerke: *See*—
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Frohberger, Paul-Ernst: *See*—
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Fromm, Walter, to Zeiss Ikon AG. Magnetic door lock system. 3,919,869, Cl. 70-263.000.

Fromson, Howard A. Process for continuously anodizing aluminum. 3,920,525, Cl. 204-28.000.

Fuhr, Gunter; and Reetz, Heinz, deceased (by Reetz, Hildegard, heir), to Fritz Schwarzer GmbH. ECG instrument. 3,921,147, Cl. 340-172.500.

Fuji Photo Film Co., Ltd.: *See—*
Shiba, Keisuke; and Hinata, Masanao, 3,920,458.
Fuji Shashin Film Kabushiki Kaisha: *See—*
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Fujii, Akira: *See—*
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Fujii, Sakumi: *See—*
Toshimitsu, Itaru; Fujii, Sakumi; and Nakajima, Taketoshi, 3,920,797.
Fujisawa, Kazuo, to Osaka University. Device for observing waveform of microwave signal. 3,921,028, Cl. 315-9.000.
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Fujiwara, Shohei: *See—*
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Fujiwara, Takao: *See—*
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Fujiwara, Yoshihiro; and Nakabe, Ryuhei, to Matsushita Electric Industrial Co., Ltd. D.C. controlled chroma circuit. 3,921,205, Cl. 358-34.000.
Fujiyoshi, Kazuhiko: *See—*
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Fukai, Masakazu; Nagata, Seiichi; Asai, Komei; and Hattori, Katsuji, to Matsushita Electric Industrial Co., Ltd. Method of driving liquid crystal display device. 3,921,162, Cl. 340-324.00M.
Fukuda, Michio: *See—*
Takaoka, Ichiro; Fukuda, Michio; Kisaki, Takuro; Kitano, Hiroshi; Koiwai, Akira; Shinohara, Toshikiyo; Araiba, Kiyotomo; Kitamura, Toshiaki; and Yamamoto, Yoshitada, 3,920,440.
Fukumoto, Hisashi: *See —*
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Fukuroi, Takeo, to Yoshida Kogyo Kabushiki Kaisha. Automatically locking slider for slide fasteners. 3,919,746, Cl. 24-205.14R.
Fuller, Neal B.: *See—*
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Furane Plastics, Inc.: *See—*
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Furukawa, Jun-ichi; and Kono, Yoshinao, to Kao Soap Co., Ltd. Sizing agent for glass fibers. 3,920,596, Cl. 260-22.00R.
Fusaro, Ramon M., to Regents of the University of Minnesota. Method of protecting human skin from actinic radiation. 3,920,808, Cl. 424-59.000.
Futaba Denki Kogyo Kabushiki Kaisha: *See—*
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G. D. Searle & Co.: *See—*
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Gaenzler, Wolfgang; Kabs, Klaus; and Schroeder, Guenter, to Rohm GmbH. Method for the preparation of $\alpha,\beta$-unsaturated carboxylic acids. 3,920,736, Cl. 260-533.00A.
GAF Corporation: *See—*
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Randall, David I.; and Wynn, Robert W., 3,920,439.
Gallagher, John T.: *See—*
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Gallistel, Albert F. Zoom lens view finder systems. 3,921,189, Cl. 354-220.000.
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Galya, William; and Shuffield, Jack E. Parallel looper-stitching device. 3,919,942, Cl. 112-166.000.
Gamble, John G.; and Ames, Allan R., to Veeder Industries, Inc. Indicating potentiometer. 3,921,068, Cl. 324-98.000.
Gandhi, Haren S.; Heintz, Walter K.; and Shelef, Mordecai, to Ford Motor Company. Catalyst converter. 3,920,404, Cl. 23-288.0FC.
Ganellin, Charon Robin: *See—*
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Gardner, Lloyd E.: *See—*
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Gargini, Eric John, to Communications Patents Limited. Wired broadcasting systems. 3,920,906, Cl. 179-1.00B.
Garland, Milton W.; and Fish, Robert C., to Frick Company. Direct liquid refrigerant supply and return system. 3,919,858, Cl. 62-498.000.
Garrett, Richard H.: *See—*
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Garrison, Richard Lee; Prengle, Herman W., Jr.; and Mauk, Charles E., to Houston Research, Inc. Method of destroying cyanides. 3,920,547, Cl. 210-63.000.
Garver, William Joseph, to AMP Incorporated. Stackable electrical connector assembly. 3,920,309, Cl. 339-198.00G.
Gasner, Earl L., to Addressograph-Multigraph Corporation. Method of electrostatic duplicating by image transfer. 3,920,453, Cl. 96-1.400.
Gates, Walter C., Jr.: *See—*
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Gatiss, John William; Joynes, Peter Leonard; and Liszka, Romuald-Jerzy, to Pye Ltd. Flame ionisation detectors. 3,920,401, Cl. 23-254.0EF.
Gebel, Kurt M., to Landis Tool Company. Loader assembly for a machine tool. 3,920,131, Cl. 214-1.0BD.
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Generaux, Stephen P. Modular block construction system. 3,919,785, Cl. 35-27.000.
Genkin, Vitaly Yakovlevich; Gankin, Vladimir Borisovich; Budkevich, Alexandr Georgievich; and Sirota, Vladimir Efremovich. Mandrel for continuous casting of hollow ingots. 3,920,064, Cl. 164-273.00R.
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Gigliello, Joseph F.; and Kragle, Harry A., to Corning Glass Works. Method and apparatus for multiphase fluid collection and separation. 3,920,549, Cl. 210-83.000.

Gijrath, Johannes Henricus Nicolaas: *See—*
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Gillemot, George W.; and Thompson, John T. Kit of splice components for encapsulating a cable splice and method of installing same. 3,920,886, Cl. 174-93.000.

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Girotra, Narindar N.; and Wendler, Norman L., to Merck & Co., Inc. Chemical compounds and processes. 3,920,637, Cl. 260-240.00R.

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Glandfield, Robert J., to Canbar Industrial Plastics. Spiral drain scoop for rotating drum. 3,919,865, Cl. 69-30.000.

Glaser, David; and Kupsky, George A., to Burroughs Corporation. Display panel having memory. 3,921,021, Cl. 313-188.000.

Gleason, John G.; Holden, Kenneth G.; and Yim, Nelson C. F., to Smithkline Corporation. Substituted glycines. 3,920,730, Cl. 260-482.00C.

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Godbee, Herschel W.; Cathers, George I.; and Blanco, Raymond E., to United States of America, Energy Research and Development Administration. Iodine retention during evaporative volume reduction. 3,920,577, Cl. 252-301.10W.

Godtfredsen, Wagn Ole, to Leo Pharmaceutical Products Ltd. Composition for treatment of arthritis. 3,920,817, Cl. 424-242.000.

Godwin, Stanley J.; and Lund, Richard M., to General Electric Company. Water closet having a bowl and a wash means. 3,919,726, Cl. 4-10.000.

Goeth, Hanns: *See—*
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Goetz, Guenther, to Bostik G.m.b.H. Multipane glazing unit. 3,919,821, Cl. 52-398.000.

Goff, Richard Everett, Jr.; and Guay, Normand Daniel, to Johnson & Johnson. Curvilinear waistband fabric. 3,920,054, Cl. 139-421.000.

Goins, Mack. Pipe cutter. 3,920,070, Cl. 166-55.800.

Goldberg, Eugene P.; and Seanor, Donald A., to Xerox Corporation. Permanent electrostatic master. 3,919,938, Cl. 101-401.100.

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Gombrich, Peter P.; and Gallagher, John T., to Medtronic, Inc. Evaluation system for cardiac stimulators. 3,920,005, Cl. 128-2.06R.

Gondo, Hisashi; Takechi, Hiroshi; Abe, Mitsunobu; Uehara, Norimasa; and Komiya, Kunihiko, to Nippon Steel Corporation. Press forming cold rolled steel sheet and a producing method thereof. 3,920,487, Cl. 148-12.00C.

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Goppen, Albert Adolfovich; Nikolaer, Igor Vladimirovich; Dronova, Lidia Mikhailovna; and Lednikov, Anatoly Ivanovich. Pneumatic hammer. 3,920,086, Cl. 173-134.000.

Gordon, Harry W., to Schmid Laboratories, Inc. Method of treating benign prostatic hypertrophy with aureofacin. 3,920,813, Cl. 424-115.000.

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Gothreaux, Roger L.; and Campbell, Louie A. Ball game. 3,920,245, Cl. 273-95.00H.

Goto, Kenji; and Niwa, Takao, to Toyota Jidosha Kogyo Kabushiki Kaisha. Combustion chamber of a spark ignition engine. 3,919,982, Cl. 123-32.00E.

Goto, Kenji, to Toyota Jidosha Kogyo Kabushiki Kaisha. Output controlling method and device for internal combustion engines. 3,919,986, Cl. 123-75.00E.

Graham, John R.; and Crooke, Robert C., to Global Marine, Inc. Deep ocean mining ship. 3,919,958, Cl. 114-.50D.

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Grane, Henry R.: *See—*
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Grant, James; and Warburton, Clive Rowland, to General Electric Company Limited, The. Electric pulse train generators and frequency synthesisers. 3,920,897, Cl. 178-66.00R.

Grantham, Frederick W. Laundry folder for pieces of variable resilience. 3,920,237, Cl. 270-62.000.

Grantham, Frederick W. Extractor for airborne particulate matter. 3,920,425, Cl. 55-227.000.

Gray, Herbert Lewis. Rotary engines and pumps. 3,920,359, Cl. 418-87.000.

Gray, Martin D., to C. J. Kennedy Company. Read circuit and process for reading multi-track recorded information with partial time multiplexing. 3,921,212, Cl. 360-51.000.

Greb, Kenneth W. Paper clip cartridge. 3,920,150, Cl. 221-198.000.

Grecsek, John Jerome, to Colgate-Palmolive Company. Softener-detergent composition. 3,920,564, Cl. 252-8.750.

Green, Robert Franklin, to Johns-Manville Corporation. Wall structure and device for sealing thereof. 3,919,820, Cl. 52-396.000.

Greenberg, Charles B.; and Harmon, Peter P. Transparent metal film having a brown-gray appearance. 3,920,864, Cl. 117-71.00R.

Greene, Walter John, to Mars, Inc. Apparatus for identifying coins. 3,921,003, Cl. 250-557.000.

Greenfield, Anthony F., to Sollins, Stanley, a part interest. Fuel injector. 3,920,775, Cl. 261-23.00A.

Grewe, Ferdinand: *See—*
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Grier, Nathaniel, to Merck & Co., Inc. Oxazinium salts. 3,920,642, Cl. 260-244.00R.

Grieves, Lowell G.; and Wightman, William S., to Albany International Corporation. Non-woven papermakers felt. 3,920,511, Cl. 162-348.000.

Griffin, Roger Thomas, to RCA Corporation. Peak voltage detector circuits. 3,921,010, Cl. 207-235.00A.

Grimm, Henry G., Jr. Sewing needle for cleat bookbinding. 3,920,272, Cl. 289-18.000.

Groos, Horst Hans, to Schloemann-Siemag AG. Press with a pre-stressed frame. 3,919,878, Cl. 72-456.000.

Gropp, Karl H., to Ford Motor Company. Fluid flow control device. 3,920,041, Cl. 137-599.000.

Gross, Walter H.: *See—*
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Grossman, Norman J.: *See—*
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Grotheer, Morris P., to Hooker Chemicals & Plastics Corporation. Method of producing chlorine dioxide from hydrogen chloride. 3,920,801, Cl. 423-477.000.

Grove, Carl A.: *See—*
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Grubb, Robert G., to Allis-Chalmers Corporation. Automatic locking device for hydraulic turbine wicket gates. 3,920,351, Cl. 415-163.000.

Grube, William L., to MacLean-Fogg Lock Nut Co. Combination of relatively thin sheet of metal and pierce nut. 3,920,059, Cl. 151-41.720.

Gruber, Wolfgang: *See—*
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Gruner, Karl, to Samson Apparatebau A.G. Device for obtaining quiet operation of valves, more particularly pressure reducing valves. 3,920,044, Cl. 137-625.300.

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GTE Automatic Electric (Canada) Limited: *See—*
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GTO Enterprises, Inc.: *See—*
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Guanella, Gustav, to Patelhold Patentwerwertungs- & Elektro-Holding AG. Apparatus for enciphering transmitted data by interchanging signal elements of the transmitted data without overlapping or omitting any elements within the transmitted signal train. 3,921,151, Cl. 340-172.500.

Guay, Normand Daniel: *See—*
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Guillot, Francis Jacques. Apparatus for preventing fraudulent operation of parking meters. 3,920,112, Cl. 194-102.000.

Guisinger, Barrett E.: *See—*
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Gujer, Peter; Schellenberg, Hans; and Wust, Olivier, to Rieter Machine Works Ltd. Winding apparatus with automatic changing of tubes or the like. 3,920,193, Cl. 242-18.00A.

Gunderson, Allan W.; and Cervay, Russell R., to United States of America, Air Force. Horizontal loading fixture for sustained load testing. 3,919,884, Cl. 73-95.000.

Gundry, Kenneth James, to Dolby Laboratories, Inc. Adjustable equalizers useable in audio spectrum. 3,921,104, Cl. 333-28.00R.

Gunther, Peter: *See—*
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Gupta, Pramod: *See—*
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H. A. Phillips & Co.: *See—*
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Haas, Gerhard J., to General Foods Corporation. Ready-to-eat cereal containing debittered soy products. 3,920,852, Cl. 426-62.000.

Haas, Hans: *See—*
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Haemmerle, Bernard; Sillion, Bernard; and De Gaudemaris, Gabriel, to Institut Francais du Petrole Des Carburants et Lubrifiants. New organic compounds for use as fuel additives. 3,920,698, Cl. 260-326.5FM.

Haenni & Cie. Aktiengesellschaft: *See—*
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Hagar, James L.; and Schwartz, Harold E., Jr., to Mobil Oil Corporation. Automatic data retrieval system for pumping wells. 3,921,152, Cl. 340-172.500.

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Hahmann, Otto: *See—*
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Hahn, Frederick C.; and Jones, Larren F., to Esco Corporation. Excavating tooth assembly. 3,919,792, Cl. 37-142.00R.

Haigh, Richard Woolliscroft, to Lucas Aerospace Limited. Fluid flow control valve. 3,919,923, Cl. 91-51.000.

Hain, Gottfried; Pellikan, Christian; and Haas, Hans, to ALPMA Alpenland-Maschinenbau Hain & Co. KG. Method of preserving and packaging cheese. 3,920,850, Cl. 426-394.000.

Haines, Richard M.: *See—*
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Hall, Jerry L.: *See—*
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Hall, John T.; and Wagner, George J., Jr., to United States Steel Corporation. Curved roll rack. 3,920,065, Cl. 164-282.000.

Hall, Kenneth F. Disposable vomiting bag. 3,920,179, Cl. 229-63.000.

Hallay, Alexander Robert, to General Electric Company. Thermal regulator ballast. 3,921,032, Cl. 315-106.000.

Hallerback, Stig Lennart, to SKF Industrial Trading and Development Company B.V. Electric motor. 3,921,017, Cl. 310-216.000.

Halls, Lawrence M.; and Seymour, Shaun A., to Sperry Rand Corporation. Crop harvesting machine convertible between field operating and road transporting orientations. 3,919,831, Cl. 56-228.000.

Halpern, Peter H., to General Dynamics. High density data processing system. 3,921,210, Cl. 360-40.000.

Halwas, Larry E.: *See—*
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Hamilton, Charles Howard; and Ascani, Leonard A., Jr., to Rockwell International Corporation. Method for superplastic forming of metals with concurrent diffusion bonding. 3,920,175, Cl. 228-173.000.

Hamilton, Douglas D.; and Boivin, Joseph J. R., to Logging Development Corporation. Felling head. 3,920,057, Cl. 144-34.00E.

Hammer, Klaus; Porrmann, Herbert; and Lucas, Klaus Jurgen, to Hoechst Aktiengesellschaft. Process for the manufacture of a chemically bonded non-woven fiber material in sheet form. 3,920,868, Cl. 427-354.000.

Hamner, Glen P.; and Sawyer, Willard H., to Exxon Research & Engineering Co. Hydrocarbon hydrodesulfurization utilizing a catalyst of germanium group VI-B and VIII components on alumina. 3,920,539, Cl. 208-216.000.

Hanauye, Kunio; Iwasa, Mitsuhiro; Takase, Tsutomu; Ito, Mizuo; Sato, Yoshio; Toyama, Teruhiko; Morikawa, Osamu; and Imai, Takamitsu, to Mitsui Toatsu Chemicals, Incorporated. Novel insecticides and method for exterminating larvae of mosquitoes therewith. 3,920,846, Cl. 424-346.000.

Handa, Susumu; Tanaka, Yoshiaki; Nishibata, Atsushi; and Inamoto, Yoshiaki, to Kao Soap Co., Ltd. Process for preparing halogen-containing organic isocyanates. 3,920,644, Cl. 260-248.0NS.

Hannah, Robert W.: *See—*
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Hansen, Walter; Harris, Joel S.; and Klepper, Herbert, to Eltra Corporation. Font strip and retaining mechanism for a photocomposing machine. 3,921,182, Cl. 354-15.000.

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Hanson, William P., Jr. Portable reversible water color stretcher-easel. 3,920,213, Cl. 248-464.000.

Hara, Haruichi; and Adachi, Akiyoshi, to Nippon Shokubai Kagaku Kogyo Co., Ltd. Extrusion moulding method. 3,920,783, Cl. 264-118.000.

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Harada, Katsuzo: *See—*
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Harada, Susumu; Haruta, Masami; and Kato, Tadashi, to Nitto Boseki Co., Ltd. Method for inhibiting corrosion of metal using polysulfone compounds. 3,920,392, Cl. 21-2.50R.

Harada, Tadamasa: *See—*
Shiki, Takehiko; Harada, Ikuo; Harada, Tadamasa; and Shiga, Masaaki, 3,920,575.

Haraikawa, Tetsuo, to Tokico Ltd. Automatic gap adjuster for a disc brake unit. 3,920,103, Cl. 188-71.900.

Harbeke, Gerold J.: *See—*
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Hardesty, Samuel J., Jr.; and Lloyd, Raymond A., to Westinghouse Electric Corporation. Test system having memory means at test module. 3,921,139, Cl. 340-152.00R.

Hardtmann, Goetz E., to Sandoz, Inc. Hypolipidemic 5-phenyl-2-oxyacetic and 2-mercaptoacetic acids and esters. 3,920,648, Cl. 260-251.00R.

Hardy, John W., to Itek Corporation. Analog data processor. 3,921,080, Cl. 328-133.000.

Harmison, Lowell T., to United States of America, Health, Education and Welfare. Totally implantable artificial replacement heart. 3,919,722, Cl. 3-1.700.

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Harmon, William M., to United Sheet Metal Company. Multiple-control air distribution outlet device. 3,919,929, Cl. 98-41.000.

Harrington, Joseph Kenneth; Kvam, Donald C.; Mendel, Arthur; and Robertson, Jerry E., to Minnesota Mining and Manufacturing Co. Method comprising the use of N-substituted perfluoroalkyanesulfonamides as herbicidal and plant growth modifying agents, and composition. 3,920,444, Cl. 71-103.000.

Harrington, Joseph Kenneth; Kvam, Donald C.; Mendel, Arthur; and Robertson, Jerry E., to Minnesota Mining & Manufacturing Company. Herbicidal trifluoromethylsulfonamido-pyrazoles. 3,920,690, Cl. 260-310.00R.

Harris, Dwight L., to Cyprus Mines Corporation. Production of purified calcium carbonate. 3,920,800, Cl. 423-432.000.

Harris, Jay H., to United States of America, Navy. Continuous fiber optical transmit and receive terminal. 3,920,982, Cl. 250-199.000.

Harris, Joel S.: *See—*
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Harris, Lewis Nigel, to GKN Screws & Fasteners Limited. Heading machines. 3,919,874, Cl. 72-337.000.

Harrison, Reginald; Smedley, Michael John; and Wing, Bernard Ridge, to Dunlop Limited. Rubber springs. 3,920,231, Cl. 267-35.000.

Harrison, Robert S.; Medrick, John D.; and Nowroski, Alvin P., to Ford Motor Company. Carburetor fast idle cam throttle positioner. 3,920,777, Cl. 261-39.00B.

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**Harvey, Robert Joseph**; and Fennell, John Richard, to Mirlin Corporation. Taste-modifying composition. 3,920,815, Cl. 424-175.000.
**Hasegawa, Shin**; Brewster, Linda C.; and Maier, Vincent P., to United States of America, Agriculture. Limonoate:NAD(P) oxidoreductase and debittering of citrus juices and other products. 3,920,851, Cl. 426-51.000.
**Hashiue, Masakazu**, to Fuji Shashin Film Kabushiki Kaisha. Color image displaying device. 3,921,029, Cl. 315-30.000.
**Hasler AG**: *See*—
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**Hatano, Yoshihiro**; and Yamamoto, Kenji, to Yamamoto Kagaku Gosei Kabushiki Kaisha. Pressure-and-heat-sensitive copying paper. 3,920,510, Cl. 162-162.000.
**Hattori, Hiroyuki**: *See*—
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**Haubner, Georg**; Wesemeyer, Jurgen; and Meier, Werner, to Robert Bosch GmbH. Method and apparatus for automatic shift of ignition timing. 3,919,987, Cl. 123-117.00R.
**Haughton, Ernest**, to Merseyside Passenger Transport Executive. Power operated door assemblies for passenger transport vehicles. 3,919,809, Cl. 49-368.000.
**Hauser, Frank W.**, to Telautograph Corporation. Compliant printer blade for facsimile printer. 3,921,181, Cl. 346-73.00E.
**Hauser, Rainund**: *See*—
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**Haussels, Berthold**, to Acousa Saxon S.A., Firma. Combined axial-radial bearings. 3,920,292, Cl. 308-174.000.
**Hawker Siddeley Aviation Limited**: *See*—
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**Hayama, Akio**. Process and equipment for continuous manufacture of corrugated cardboard box. 3,919,925, Cl. 93-94.0PS.
**Hayashi, Katsumi**, to Lubrizol Corporation, The. Esters of sulfur-containing hydroxy acids. 3,920,700, Cl. 260-327.00R.
**Hayashi, Takao**: *See*—
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**Hayashi, Yoshihisa**: *See*—
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**Hayashi, Yurio**: *See*—
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**Heberlein & Co. AG**: *See*—
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**Hedelin, Lars**. Grinding wheel for forming a facet on the periphery of an eyeglass lens. 3,919,811, Cl. 51-204.000.
**Heffner, Samuel T.**; and Kowalik, Ronald F., to GTE Automatic Electric Laboratories Incorporated. Multi-phase clock distribution system. 3,921,079, Cl. 328-62.000.
**Hegedus, Balthasar**; and Krasso, Anna, to Hoffmann-La Roche Inc. Separation and resolution of isomeric forms of 3-(3,4-dihydroxyphenyl)-serine. 3,920,728, Cl. 260-471.00C.
**Heian, Glenn A.**, to Allis-Chalmers Corporation. Method and furnace for heat treating material. 3,920,380, Cl. 432-2.000.
**Heich Die Casting Corporation**: *See*—
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**Heiligenmann, Erwin**: *See*—
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**Heimbach, Paul**: *See*—
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**Heimke, Gunther**; Hennicke, Hans Walter; and Gugel, Ernst, to Friedrichsfeld GmbH Steinzeug-und Kunstostoffwerke. Bone shaft or bone joint prosthesis and process. 3,919,723, Cl. 3-1.900.
**Heinemann, Otto**, to Polysius AG. Rotary furnace having a planetary cooler. 3,920,381, Cl. 432-80.000.
**Heinicke, Harald**, to Siemens Aktiengesellschaft. Apparatus for converting D.C. voltage. 3,921,054, Cl. 321-2.000.
**Heintz, Walter K.**: *See*—
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**Heinz, James B.**, to Eastman Kodak Company. Process for the production of neopentyl glycol. 3,920,760, Cl. 260-635.00A.
**Hekimian Laboratories, Inc.**: *See*—
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**Hekimian, Norris C.**, to Hekimian Laboratories, Inc. DC-to-DC Converter. 3,921,053, Cl. 321-2.000.
**Heldmann, Ernest J.**; and Capuano, Terry D., to Veeder Industries, Inc. Cup-point fastener. 3,920,060, Cl. 151-70.000.
**Helleur, Donald Edmund**. Method and apparatus for removing volatile fluids. 3,920,505, Cl. 159-47.0WL.
**Helling, Oscar D.**, to GTO Enterprises, Inc. Test stand for solenoid switches. 3,921,063, Cl. 324-28.00R.
**Henderson, J. Craig**; Teller, Thomas G.; and Morrell, T. Herbert, to Owatonna Manufacturing Company, Inc. Utility vehicle. 3,920,092, Cl. 180-6.480.
**Hendrix, James N., Jr.** Apparatus for tightening belts. 3,920,219, Cl. 254-67.000.
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**Hicks, Leslie E.** Incremental butter dispenser. 3,920,156, Cl. 222-80.000.
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**Hill, Rodney E.**: *See*—
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**Hiltebrandt, Siegfried**. Coagulating devices. 3,920,021, Cl. 128-303.170.
**Hilton, Richard F.**: *See*—
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**Hirst Microwave Industries Limited**: *See*—
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**Hirzel, Edgar A.**; and Cook, Robert Dale, to Crane Co. Selective deceleration brake control system. 3,920,278, Cl. 303-21.0BE.
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Hodgson, Alfred W., to Westinghouse Electric Corporation. Circuit-interrupter. 3,921,109, Cl. 335-195.000.

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Horisawa, Toshiji; Kojima, Takeshi; and Itoh, Ryoichi, to Kanegafuchi Kagaku Kogyo Kabushiki Kaisha. Recovery of free methionine. 3,920,737, Cl. 260-534.00S.

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Horowitz, Charles F.; and Klimek, Boleslaw, to Berg Manufacturing Company, The. Relay emergency valve. 3,920,045, Cl. 137-627.500.

Hort, Eugene V., to GAF Corporation. Ethynylation catalyst and method of producing alkynols by low pressure reactions. 3,920,759, Cl. 260-635.00Y.

Horvath, Lajos; and Steck, Arnold, to Heberlein & Co. AG. Friction false-twist device. 3,919,833, Cl. 57-77.400.

Horvath, Sandor J., to Eltra Corporation. Direct current power converter. 3,921,197, Cl. 321-18.000.

Hoshide, Kou: *See*—
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Houlihan, William J., to Sandoz, Inc. 3-Substituted-1-pyridyl-1,4,5,6-tetrahydropyridazines. 3,920,646, Cl. 260-250.00A.

Houseman, John, to California Institute of Technology. Hydrogen-rich gas generator. 3,920,416, Cl. 48-95.000.

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Huang, Shuan K., to Monsanto Company. Production of alkylaryl sulfonates including the step of dehydrogenating normal paraffins with an improved catalyst. 3,920,615, Cl. 260-683.300.

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**Imai, Isao;** and Shiozaki, Hiroyuki, to Ishikawajima-Harima Jukogyo Kabushiki Kaisha. System for controlling eccentricity of rolling mill. 3,920,968, Cl. 235-151.100.

**Imai, Takamitsu:** *See—*
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**Inada, Masami;** and Ando, Masamoto, to Aisin Seiki Kabushiki Kaisha. Anti-skid brake control assembly of the diaphragm type. 3,920,279, Cl. 303-21.00F.

**Inamoto, Yoshiaki:** *See—*
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**Inventors Engineering, Inc.:** *See—*
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**Isbell, Robert W.** Electronic musical conductor. 3,919,915, Cl. 84-484.000.

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**Itek Corporation:** *See—*
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**Ito, Hiroshi,** to Tokico, Ltd. Disc brake actuating and adjusting mechanism. 3,920,102, Cl. 188-71.900.

**Ito, Mizuo:** *See—*
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**Itoi, Hiroyasu:** *See—*
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Jacobs, Richard L.; Backley, Donald A.; Simpson, James V.; and Beck, Walter, to Stepan Chemical Company. Low-density polyester resin foams and method of preparation. 3,920,590, Cl. 260-2.50N.
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Jarrett, Boaz Antony; and Fenne, Ivor, to C.A.V. Limited. Fuel injection pumping apparatus. 3,919,989, Cl. 123-139.00R.
Jayne, Theodore D., to United States of America, Navy. Bounce drive system. 3,921,014, Cl. 310-8.100.
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Jenkins, Daniel T. Chess game apparatus. 3,920,247, Cl. 273-131.0AB.
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Johnson, Frederick M. Woven structural element, method of manufacture thereof, and method of making a boat hull therefrom. 3,920,871, Cl. 161-36.000.
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Jones, Freeman B., Jr.; Chang, Roger; and Parry, Edward P., to Rockwell International Corporation. Doping of nematic liquid crystal. 3,920,576, Cl. 252-299.000.
Jones, James Kevin, to Petrocarbon Developments Limited. Reliquefaction of boil off gas. 3,919,852, Cl. 62-7.000.
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Jones, Robert K.; and Meneshian, Murad A., to Teletype Corporation. Prevention of aluminum etching during silox photoshaping. 3,920,471, Cl. 134-3.000.
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Kanengieter, Glenn G.; and Barry, Gerald E., to Owatonna Manufacturing Co. Stack processor. 3,920,190, Cl. 241-30.000.

Kanzaki Paper Manufacturing Co., Ltd.: *See—*
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Karasawa, Takashi, to Rikagaku Kenkyusho. Self-shielding type cyclotron. 3,921,019, Cl. 313-62.000.

Karsas, Martin A., to GTE Automatic Electric Laboratories Incorporated. Arrangement and method for switching the electronic subsystems of a common control communication switching system without interference to call processing. 3,920,977, Cl. 235-153.0AE.

Kashio, Toshio, to Casio Computer Co., Ltd. Electronic clock apparatus. 3,919,835, Cl. 58-50.00R.

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Katzen, Raphael; Diebold, Vincent B.; and Mestemaker, Jerald L., to Canadian International Paper Company. Process for producing vanillin. 3,920,750, Cl. 260-600.00A.

Kaufman, Martin H., to United States of America, Navy. Propellant pressure burning rate slope modification. 3,920,494, Cl. 149-19.300.

Kawai, Keiichi, to Futaba Denki Kogyo Kabushiki Kaisha. Method and apparatus for automatic production of stuffed meat. 3,919,739, Cl. 17-33.000.

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Keane, William J. Frequency discriminator apparatus. 3,921,085, Cl. 329-116.000.

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Keene, George W. Rubbing and liquid applying apparatus for hogs. 3,919,979, Cl. 119-157.000.

Keeney, Clare G., to TRW Inc. Ringback tone apparatus and telephone metering system. 3,920,913, Cl. 179-8.00A.

Keeter, Raleigh F.; Ryan, Francis D.; Wellner, Kenneth V.; and Nickstadt, Gerhard A., to General Electric Company. Pre-engagement turning gear. 3,919,894, Cl. 74-384.000.

Kell, Hermann Eckardt. Biasing ring for spectacles. 3,920,317, Cl. 351-113.000.

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Kerr, Elmer L., to Electric Furnace Company, The. Fluted surface heat exchanger. 3,920,383, Cl. 432-223.000.

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Kevorkian, Kevork: *See—*
Regnier, Albert; Canceill, Bernard Jean Jacques; Kevorkian, Kevork; and Lager, Jean Paul, 3,920,914.

Kewanee Oil Company: *See—*
Moss, Robert H.; Swinehart, Carl F.; and Spicuzza, William F., 3,920,802.

Khamits, Ljudmila Nikolaevna: *See—*
Nabiullin, Faat Khatovich; Buzova, Zoya Mikhailovna; Gertsik, Efim Mikhailovich; Koval, Ivan Ivanovich; Maslov, Vladimir Mikhailovich; and Khamits, Ljudmila Nikolaevna, 3,920,475.

Khan, Ausat Ali, to Du Pont de Nemours, E. I., and Company. Treatment of chloroprene-sulfur copolymers with benzothiazole sulfenamides. 3,920,623, Cl. 260-92.300.

Kharmats, Dmitry Efimovich: *See—*
Arifov, Ubai Arifovich; Kharmats, Dmitry Efimovich; Abdurashidov, Gafur Abdushukurovich; Leontiev, Gennady Andreevich; Zhegallo, Jury Vladimirovich; Parilis, Eduard Simkhovich; Vzenkonsky, Alexandr Vasilievich; Sapon, Anatoly Dmitrievich; Lavnikanis, Vladimir Fedorovich; Kogan, Mark Iosifovich; Egorov, Nikolai Petrovich; and Shaidullin, Abuzar Gabdurakhmanovich, 3,919,742.

Khomyakov, Ivan Ivanovich: *See*—
Myagkov, Alexei Andreevich; Raigorodsky, Mikhail Grigorievich; Uchakin, Viktor Nikolaevich; Khomyakov, Ivan Ivanovich; and Yastrebo, Boris Sergeevich, 3,921,134.

Kienzle, Jean Andre Paul; Huille, Michel Ernest Antoine; and Cabut, Louis Antoine, to Produits Chimiques Ugine Kuhlmann. Surface-treated pigments. 3,920,469, Cl. 106-288.00Q.

Kikui, Keizo: *See*—
Sasaki, Michio; and Kikui, Keizo, 3,919,790.

Kilby, Jack S.; Schweitzer, Robert F.; and McCrady, John, to Kilby, Jack S. Electronic check writer. 3,920,979, Cl. 235-168.000.

Kim, Dongsung Robert: *See*—
Emm, Michael Gene; and Kim, Dongsung Robert, 3,921,145.

Kimi, Atutane: *See*—
Yaginuma, Hiroshi; Suzuki, Takashi; and Kimi, Atutane, 3,920,769.

Kimura, Eiichi. Apparatus for discharging residual gas in aerosol cans. 3,920,162, Cl. 222-182.000.

Kindgren, Lee, to W. A Whitney Corporation. Punching machine with automatic cycle control. 3,919,907, Cl. 83-368.000.

Kindscher, Wolfgang; Beyer, Karl-Heinz; and Wulz, Klaus, to BASF Aktiengesellschaft. Low-foam surfactants resistant to alkalis. 3,920,706, Cl. 260-345.900.

King, John M.; and Peeler, Robert L., to Chevron Research Company. Heat transfer fluids. 3,920,572, Cl. 252-75.000.

Kinley, John Ross: *See*—
Cadogan-Rawlinson, Christopher Robert Johnston; and Kinley, John Ross, 3,920,364.

Kinsley, Homan B., Jr., to Ethyl Corporation. Filter element. 3,920,428, Cl. 55-528.000.

Kipfer, Peter: *See*—
Muster, Hans Ulrich; Kipfer, Peter; Aebi, Peter; and Zwahlen, Hans, 3,919,888.

Kirby, Peter: *See*—
Isaac, Eirlys R.; and Kirby, Peter, 3,920,675.

Kirchhoff, Franz Josef, to Apparatebau Rothemuhle Brandt & Kritzler. Regenerative air preheater. 3,920,066, Cl. 165-4.000.

Kirimoto, Kazusuke; and Hayashi, Takao, to Asahi Glass Company, Ltd. High soil release oil- and water-repellent copolymer. 3,920,614, Cl. 260-63.0UY.

Kirkendall, Thomas D.; and Doolittle, Howard D., to Machlett Laboratories, The. X-ray energy analyzer. 3,920,984, Cl. 250-277.000.

Kisaki, Takuro: *See*—
Takaoka, Ichiro; Fukuda, Michio; Kisaki, Takuro; Kitano, Hiroshi; Koiwai, Akira; Shinohara, Toshikiyo; Araiba, Kiyotomo; Kitamura, Toshiaki; and Yamamoto, Yoshitada, 3,920,440.

Kiser, Cecil M. Insulated container. 3,920,140, Cl. 215-100.00R.

Kishida, Yukichi: *See*—
Kitano, Noritoshi; Sugawara, Shinichi; Kishida, Yukichi; Kondo, Fusao; Sugimura, Yukio; and Soma, Nobuo, 3,920,843.

Kitajima, Tadayuki; and Suda, Masashi, to Canon Kabushiki Kaisha. Copy medium feed device. 3,920,238, Cl. 271-9.000.

Kitamura, Toshiaki: *See*—
Takaoka, Ichiro; Fukuda, Michio; Kisaki, Takuro; Kitano, Hiroshi; Koiwai, Akira; Shinohara, Toshikiyo; Araiba, Kiyotomo; Kitamura, Toshiaki; and Yamamoto, Yoshitada, 3,920,440.

Kitano, Hiroshi: *See*—
Takaoka, Ichiro; Fukuda, Michio; Kisaki, Takuro; Kitano, Hiroshi; Koiwai, Akira; Shinohara, Toshikiyo; Araiba, Kiyotomo; Kitamura, Toshiaki; and Yamamoto, Yoshitada, 3,920,440.

Kitano, Noritoshi; Sugawara, Shinichi; Kishida, Yukichi; Kondo, Fusao; Sugimura, Yukio; and Soma, Nobuo, to Sankyo Company Limited. Topical fungicidal composition for dermatomycosis of animals. 3,920,843, Cl. 424-45.000.

Klapper, Jacob: *See*—
Kratt, Edward J. A., 3rd; and Klapper, Jacob, 3,921,082.
Kratt, Edward J. A., 3rd; and Klapper, Jacob, 3,921,083.
Kratt, Edward J. A., 3rd; and Klapper, Jacob, 3,921,084.

Klatt, Alfred: *See*—
Luhdorff, Dieter; Weise, Lutz; Reinecke, Erich; and Klatt, Alfred, 3,920,280.

Klaui, Heinrich; and Korner, Wilheim Friedrich, to Hoffmann-La Roche Inc. Light-screening compositions and method. 3,920,834, Cl. 424-305.000.

Klauk, Bernhard; Schwan, Wolfgang; and Schreiber, Gunter, to K. Kuppersbusch & Sohne. Scraping and stirring device for a cooking utensil. 3,920,228, Cl. 259-107.000.

Klauke, Erich: *See*—
Wagner, Klaus; Eue, Ludwig; and Klauke, Erich, 3,920,445.

Klein, Erich, to Dragoco Spezialfabrik konz, Riech-und Aromastoffe Gerberding & Co. GmbH. Perfume composition including isomeric mixture of bicyclic nitriles. 3,920,585, Cl. 252-522.000.

Kleinewefers Industrie-Companie Gesellschaft mit beschrankter Haftung: *See*—
Junk, Dieter; Schlunke, Jurgen; and Reich, Siegfried, 3,920,275.

Klepper, Herbert: *See*—
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Klien, David Thomas: *See*—
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Klimek, Boleslaw: *See*—
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Klockner-Humboldt-Deutz AG: *See*—
Werner, Reinhold, 3,920,035.

Kloos, William W.; Osterkorn, Charles L.; and Marino, Salvatore M., to Fedders Corporation. Heating element assembly. 3,920,887, Cl. 174-148.000.

Kmonk, Stanley; and Sperhac, David J., to Westinghouse Electric Corporation. Nuclear reactor fuel assembly arrangement. 3,920,516, Cl. 176-78.000.

Knauf, Dieter W. Valve. 3,920,215, Cl. 251-7.000.

Knemeyer, Siegfried; and McElreath, Kenneth W., to United States of America, Air Force. Blended manual-automatic control system. 3,920,966, Cl. 235-150.200.

Knickerbocker Toy Co. Inc.: *See*—
White, Rod L., 3,920,239.

Knight, Frank W., Jr.: *See*—
Ell, Robert J.; and Knight, Frank W., Jr., 3,921,190.

Knight, Martin, to Raymond Lee Organization, Inc., The, a part interest. Lunch box holder. 3,920,211, Cl. 248-311.000.

Knox, Robert M.: *See*—
Martin, Daniel T.; Serrell, Morton A.; Coleman, Herbert C.; Cooper, Donald L.; Knox, Robert M.; Barnfield, Curtis L.; and Walinchus, Robert J., 3,920,967.

Knuppel, Helmut; Brotzmann, Karl; and Fassbinder, Hans Georg, to Eisenwerk-Gesellschaft Maximilianshutte mbH. Process and converter for refining liquid metals. 3,920,448, Cl. 75-60.000.

Kobayakawa, Akira. Container for ashes and embers of cigars and cigarettes. 3,920,028, Cl. 131-236.000.

Kobayashi, Nobuyuki: *See*—
Aihara, Ryuzo; Ota, Susumu; and Kobayashi, Nobuyuki, 3,921,078.

Kobori, Toshio; and Matsui, Toru, to Minolta Camera Kabushiki Kaisha. Photographic camera having electric shutter. 3,921,187, Cl. 354-50.000.

Koehlinger, Allen W.; and Rece, Wesley J., Jr., to R. A. Jones & Co., Inc. Label web and die making methods. 3,920,122, Cl. 206-390.000.

Kogan, Mark Iosifovich: *See*—
Arifov, Ubai Arifovich; Kharmats, Dmitry Efimovich; Abdurashidov, Gafur Abdushukurovich; Leontiev, Gennady Andreevich; Zhegallo, Jury Vladimirovich; Parilis, Eduard Simkhovich; Vzenkonsky, Alexandr Vasilievich; Sapon, Anatoly Dmitrievich; Lavnikanis, Vladimir Fedorovich; Kogan, Mark Iosifovich; Egorov, Nikolai Petrovich; and Shaidullin, Abuzar Gabdurakhmanovich, 3,919,742.

Kohn, Gustave K.: *See*—
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Kohno, Tetsuo: *See*—
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Koike, Hiroshi: *See*—
Naoi, Keigo; and Koike, Hiroshi, 3,921,057.

Koiwai, Akira: *See*—
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Kojima, Takeshi: *See*—
Horisawa, Toshiji; Kojima, Takeshi; and Itoh, Ryoichi, 3,920,737.

Kojyo, Hisazuchi. Device for transferring railway cars sideways. 3,919,945, Cl. 104-50.000.

Kolberg, Helmut: *See*—
Nittel, Fritz; Lohmer, Karl; and Kolberg, Helmut, 3,920,456.

Komaru, Takeshi; and Shimamura, Toshio, to Fujitsu Limited. Apparatus and method for memorizing dot patterns in a memory system. 3,921,135, Cl. 340-146.3MA.

Komatsu, Yasuhiko: *See*—
Kaneko, Yasuhisa; Komatsu, Yasuhiko; Okada, Yasuo; and Masuda, Ryuichi, 3,919,755.

Komiya, Kunihiko: *See*—
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Kommanditbolaget Rigulag AB & Co.: *See*—
Lundstrom, Rickard Verner; Lagerstrom, Curt Lennart; and Savas, Gunnar, 3,920,258.

Komori, Shigehiro; Sakamaki, Hisashi; Hattori, Hiroyuki; Iida, Toshihide; Miyamoto, Koichi; and Umezawa, Kazumi, to Canon Kabushiki Kaisha. Automatic cut sheet feeding unit. 3,919,972, Cl. 271-118.000.

Komura, Seiichi, to Mutoh Industry Ltd. Drawing table. 3,920,209, Cl. 248-162.000.

Komusin, Bruce: *See*—
Ophir, David; Shapiro, Marvin; and Komusin, Bruce, 3,921,148.

Kondo, Fusao: *See*—
Kitano, Noritoshi; Sugawara, Shinichi; Kishida, Yukichi; Kondo, Fusao; Sugimura, Yukio; and Soma, Nobuo, 3,920,843.

Konig, Klaus: *See*—
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Konishi, Kenichi; and Fujiwara, Shohei, to Matsushita Electronics Corporation. Solid state display apparatus. 3,921,026, Cl. 313-501.000.

Kono, Yoichi: *See*—
Nakashio, Seizo; Maruta, Isao; Hayatsu, Kazuo; and Kono, Yoichi, 3,920,770.

Kono, Yoshinao: *See*—
Furukawa, Jun-ichi; and Kono, Yoshinao, 3,920,596.

Koopman, Donald E.: *See*—
Brown, George T., Jr.; Clark, Donald B.; and Koopman, Donald E., 3,920,574.

Koppenaal, Theodore J.; and Sernka, Richard P., to Ford Motor Company. Thermally processed steel. 3,920,490, Cl. 148-12.400.

Korn, Alfred H.: *See—*
Weaver, Elmer; Hopkins, William J.; and Korn, Alfred H., 3,920,388.

Korner, Wilheim Friedrich: *See—*
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Kornfeld, Edmund C.: *See—*
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Kossuth, Donald A.: *See—*
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Kostal, Louis, to R. R. Donnelley & Sons Company. Magnetic cylinder for printing presses. 3,919,937, Cl. 101-378.000.

Kough, John K.: *See—*
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Koval, Ivan Ivanovich: *See—*
Nabiullin, Faat Khatovich; Buzova, Zoya Mikhailovna; Gertsik, Efim Mikhailovich; Koval, Ivan Ivanovich; Maslov, Vladimir Mikhailovich; and Khamits, Ljudmila Nikolaevna, 3,920,475.

Kowalik, Ronald F.: *See—*
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Kowalski, Slawomir, to Marotta Scientific Controls, Inc. Solenoid actuator for high pressure valve. 3,921,111, Cl. 335-255.000.

Kozawa, Akiya, to Union Carbide Corporation. Divalent silver oxide-zinc cell having a unipotential discharge level. 3,920,478, Cl. 136-111.000.

Krackenberger, Richard E.: *See—*
VandenBerg, Willard J.; Ramsey, Robert E.; Pieczko, George; Bollman, Robert L.; and Krackenberger, Richard E., 3,920,541.

Kraftco Corporation: *See—*
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Kraftwerk Union Aktiengesellschaft: *See—*
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Kragle, Harry A.: *See—*
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Kral, Johann: *See—*
Wiebke, Gunter; Stohr, Gunter; Kratel, Gunter; and Kral, Johann, 3,920,799.

Kralovopolska strojirna, narodni podnik: *See—*
Maev, Radko; Zacek, Cestmir; Janak, Petr; Strecha, Jan; Duzy, Josef; and Lucak, Ludek, 3,919,875.

Kramer, George C.: *See—*
Obeda, Edward G.; and Kramer, George C., 3,921,015.

Kraskin, Kenneth S., to Personal Products Company. Inhibiting production of undesirable products on body surfaces and environs. 3,920,020, Cl. 128-290.000.

Krasso, Anna: *See—*
Hegedus, Balthasar; and Krasso, Anna, 3,920,728.

Kratel, Gunter: *See—*
Wiebke, Gunter; Stohr, Gunter; Kratel, Gunter; and Kral, Johann, 3,920,799.

Kratt, Edward J. A., 3rd; and Klapper, Jacob, to R F L Industries, Inc. Wideband coherent FM detector. 3,921,082, Cl. 329-110.000.

Kratt, Edward J. A., 3rd; and Klapper, Jacob, to R F L Industries, Inc. Wideband coherent FM detector. 3,921,083, Cl. 329-110.000.

Kratt, Edward J. A., 3rd; and Klapper, Jacob, to R F L Industries, Inc. Wideband coherent F M detector. 3,921,084, Cl. 329-110.000.

Kraus, Constantine R. Buyer credit service for a telephone system. 3,920,908, Cl. 179-2.0CA.

Kravitz, Bernard L., to Dionics, Incorporated. Method of producing a high voltage PN junction. 3,920,493, Cl. 148-187.000.

Kreis, Werner; and Laderach, Peter, to Hasler AG. Computer comprising three data processors. 3,921,149, Cl. 340-172.500.

Krems-Chemie Gesellschaft m.b.H.: *See—*
Waldbauer, Johann, 3,920,405.

Krenzer, John, to Velsicol Chemical Corporation. Certain 1-(1,3,4-thiadiazol-2-yl)imidazolidinone-(2) compounds. 3,920,674, Cl. 260-306,8.00D.

Krieg, Martin: *See—*
Danner, Max; Krieg, Martin; and Matschke, Klaus, 3,920,406.

Kristinsson, Haukur; Hubele, Adolf; and Aufderhaar, Ernst, to Ciba-Geigy Corporation. Imidazo(4,5-b) pyridine derivatives. 3,920,669, Cl. 260-295.0CA.

Krock, Friedrich Wilhelm; and Neeff, Rutger, to Bayer Aktiengesellschaft. Anthraquinone dyestuffs. 3,920,702, Cl. 260-340.700.

Krome, Gerd, to BASF Aktiengesellschaft. Production of vinyl chloride. 3,920,761, Cl. 260-656.00R.

Kronsved, Julius, to Guternic AB. Apparatus for arranging sheets of paper in predetermined order in sets. 3,920,236, Cl. 270-58.000.

Krooss, Robert J. Bottle sensing apparatus. 3,920,118, Cl. 198-262.000.

Krueger, Wallace F. Plural component mixing head. 3,920,223, Cl. 259-8.000.

Kruglov, Vladimir Petrovich: *See—*
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Ku San-Mei: *See—*
Johnson, Claude, Jr.; Ku San-Mei; Lillja, Harold Vinell; and Shih-To Pan, Edward, 3,920,483.

Kubo, Masayoshi; Nakazawa, Yuji; and Takahashi, Katuhiko, to Daicel Ltd. Process for preparing glycidol. 3,920,708, Cl. 260-348.50L.

Kubo, Sanae: *See—*
Yamada, Junichi; Kubo, Sanae; and Hirano, Isao, 3,920,883.

Kubota, Isamu; Hayashi, Yoshihisa; and Ichikawa, Teruo, to Minolta Camera Kabushiki Kaisha. Electromagnetic release device for a motor driven motion picture camera. 3,920,321, Cl. 352-177.000.

Kugle, John L.: *See—*
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Kuhle, Engelbert: *See—*
Widdig, Arno; Kuhle, Engelbert; Sasse, Klaus; Scheinpflug, Hans; Grewe, Ferdinand; Kaspers, Helmut; and Frohberger, Paul-Ernst, 3,920,831.

Kuhlman Corporation: *See—*
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Kuhn, Klaus Roland; and Stigler, Viktor, to Siemens Aktiengesellschaft. Circuit for measuring and storing peak values of ignition voltage in an internal combustion engine. 3,921,062, Cl. 324-16.00R.

Kujave, John M.: *See—*
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Kukalenko, Stepan Sofronovich: *See—*
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Kukolja, Stjepan P.; and Lammert, Steven R., to Eli Lilly and Company. 2S-Carboxyalkylthio-3R-imidoazetidin-4-ones and compounds useful in their preparation. 3,920,696, Cl. 260-326.00S.

Kulagina, Natalya Nikolaevna: *See—*
Golyshin, Nikolai Mikhailovich; Andreeva, Elena Ivanovna; Dvoichenkova, Elza Alexandrovna; Ukrainets, Nina Sergeevna; Skazkina, Tatyana Pavlovna; Solovieva, Galina Viktorovna; Bodrova, Margarita Romanovna; Rotastikova, Nina Alexandrovna; Melnikov, Nikolai Nikolaevich; Kukalenko, Stepan Sofronovich; Nuridzhanian, Karen Armenakovich; Nesterova, Lilia Mikhailovna; Usmanov, Marat Tashpulatovich; Novikova, Raisa Grigorievna; Kuznetsova, Galina Vladimirovna; Volodkovich, Stepan Dmitrievich; Burmakin, Nikolai Mikhailovich; Obukhova, Valentina Ivanovna; Monova, Violetta Ivanovna; Shkuratova, Galina Nikonovna; Sanin, Mikhail Arsenievich; Kulagina, Natalya Nikolaevna; and Mironova, Nina Evgenievna, 3,920,680.

Kullik, Gunter, to Schnyder, Conrad Wolfgang. Dispenser for textile hand towelling web. 3,920,294, Cl. 312-38.000.

Kumashiro, Izumi: *See—*
Kawashima, Hideaki; Ozaki, Masanao; Yamada, Yoshitaka; Kumashiro, Izumi; and Ichikawa, Takehiko, 3,920,701.

Kunda, Wasyl; and Randell, Donald Alan, to Sherritt Gordon Mines Limited. Cobalt coated composite powder. 3,920,410, Cl. 29-192.00R.

Kunz, Lawrence J., Jr.: *See—*
Zito, Ralph, Jr.; and Kunz, Lawrence J., Jr., 3,920,474.

Kupsky, George A.: *See—*
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Kural, Murat H.: *See—*
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Kuraray Co. Ltd.: *See—*
Nakagawa, Junyo; Ohno, Yoshikata; Esaki, Tamemaru; and Ueda, Keizo, 3,920,784.

Kurata, Masaharu: *See—*
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Kurita, Takaji; and Fujiwara, Takao, to Minolta Camera Kabushiki Kaisha. Photocopying machine. 3,920,331, Cl. 355-16.000.

Kuroda, Hideo: *See—*
Shimada, Fumitake; Ikekawa, Tetsuro; Tachibana, Kooichi; Endo, Tomio; Kohno, Tetsuo; Kuroda, Hideo; Ikeda, Yoshiaki; Okazaki, Yoshimi; and Sawa, Yoshio, 3,920,665.

Kurt H. Volk, Inc.: *See—*
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Kuts, Mathew, to B. F. Goodrich Company, The. Tire truing machine. 3,919,904, Cl. 82-47.000.

Kuwano, Nobuyori; and Tsuchiya, Takayoshi, to Showa Manufacturing Co., Ltd. Shock absorbing device for skis of snow mobiles. 3,920,091, Cl. 180-5.00R.

Kuznetsova, Galina Vladimirovna: *See—*
Golyshin, Nikolai Mikhailovich; Andreeva, Elena Ivanovna; Dvoichenkova, Elza Alexandrovna; Ukrainets, Nina Sergeevna; Skazkina, Tatyana Pavlovna; Solovieva, Galina Viktorovna; Bodrova, Margarita Romanovna; Rotastikova, Nina Alexandrovna; Melnikov, Nikolai Nikolaevich; Kukalenko, Stepan Sofronovich; Nuridzhanian, Karen Armenakovich; Nesterova, Lilia Mikhailovna; Usmanov, Marat Tashpulatovich; Novikova, Raisa Grigorievna; Kuznetsova, Galina Vladimirovna; Volodkovich, Stepan Dmitrievich; Burmakin, Nikolai Mikhailovich; Obukhova, Valentina Ivanovna; Monova, Violetta Ivanovna; Shkuratova, Galina Nikonovna; Sanin, Mikhail Arsenievich; Kulagina, Natalya Nikolaevna; and Mironova, Nina Evgenievna, 3,920,680.

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Harrington, Joseph Kenneth; Kvam, Donald C.; Mendel, Arthur; and Robertson, Jerry E., 3,920,690.

Kwiatkowski, George T., to Union Carbide Corporation. Arylimide-epoxy resin composites. 3,920,768, Cl. 260-837.00R.

Kwok, Clyde C. K., to Rippingille, Edward V., Jr. Fluid oscillator with feedback and pulsating shower head employing same. 3,920,185, Cl. 239-102.000.

L. B. Manufacturing Company: *See—*
Bluestone, Leonard L., 3,920,271.

L.M. Ericsson Pty Lid.: *See—*
Thomas, James Houghton, 3,920,918.

Labaz: *See—*
Descamps, Marcel; Gubin, Jean; and Claeys, Norbert, 3,920,707.

LaBeaud, Louis J. Folding rack for clothes hangers. 3,920,127, Cl. 211-118.000.

Lacaze, Pierre Camille: *See—*
Dubois, Jacques Emile; Lacaze, Pierre Camille; Le Gressus, Claude; and Massignon, Daniel, 3,921,031.

Lacher, William A., to Burroughs Corporation. Standardizing logic gate. 3,921,007, Cl. 307-218.000.

Lachnit, Friedrich, to Deutsche Babcock & Wilcox A.G. Apparatus for the purification of combustion gases. 3,920,427, Cl. 55-418.000.

Laderach, Peter: *See—*
Kreis, Werner; and Laderach, Peter, 3,921,149.

Lafferty, James W. Vehicle low-load isolator spring suspension apparatus. 3,920,264, Cl. 280-124.00R.

Lager, Jean-Paul; and Refol, Didier, to International Standard Electric Corporation. Data insertion in the speech memory of a time division switching system. 3,920,920, Cl. 179-15.0BY.

Lager, Jean Paul: *See—*
Regnier, Albert; Canceill, Bernard Jean Jacques; Kevorkian, Kevork; and Lager, Jean Paul, 3,920,914.

Lagerstrom, Curt Lennart: *See—*
Lundstrom, Rickard Verner; Lagerstrom, Curt Lennart; and Savas, Gunnar, 3,920,258.

Laing, Ingeborg: *See—*
Laing, Nikolaus; and Laing, Ingeborg, 3,920,953.

Laing, Nikolaus; and Laing, Ingeborg. Building plates with controllable heat insulation. 3,920,953, Cl. 219-378.000.

Laird, Joseph W.; and Baker, Roy V., to United States of America, Agriculture. Removal of green bolls and heavy materials from seed cotton by air jets. 3,920,542, Cl. 209-134.000.

Laky, Tibor, to Otis Engineering Corporation. Method for inserting flexible pipe into wells. 3,920,076, Cl. 166-315.000.

Lalesse, Herman Cornelis, to U.S. Philips Corporation. Multi-channel magnetic head. 3,921,219, Cl. 360-121.000.

La Mantia, Charles R.; and Stevens, James I., to Arthur D. Little, Inc. Method for removal of sulfur dioxide from gases. 3,920,794, Cl. 423-242.000.

Lambert, Robert R., to Wehr Corporation. Suspended ceiling and air distribution arrangement. 3,919,928, Cl. 98-40.00D.

Lamborn, Homer C., to United States Pipe and Foundry Company. Method and apparatus for sizing joint rings for cylindrical pipes. 3,920,174, Cl. 228-155.000.

Lammert, Steven R.: *See—*
Kukolja, Stjepan P.; and Lammert, Steven R., 3,920,696.

Lamparsky, Dietmar, to Givaudan Corporation. Novel gamma, delta unsaturated aldehydes. 3,920,752, Cl. 260-601.00R.

Landis Tool Company: *See—*
Gebel, Kurt M., 3,920,131.

Lane, Eneas James; Klien, David Thomas; and Geppert, Steven, to Eaton Corporation. Monitoring circuitry for a skid control system. 3,920,284, Cl. 303-21.0AF.

Lane, Lawrence Jubin, to General Electric Company. Pulse generator for producing pulses of definable width. 3,921,081, Cl. 328-140.000.

Langnickel, Wolfgang, to Olympia Werke AG. Control apparatus for the recording head of a parallel printer. 3,919,935, Cl. 101-93.040.

Lapidus, Roy, to Roy Lapidus, Inc. Inflatable device for healing of tissue. 3,920,006, Cl. 128-24.100.

Lapointe, Lloyd J., to Magsat Corporation. Electrical switch. 3,920,943, Cl. 200-159.00R.

Larson, Richard T.; and Leatherbury, William F., to Union Carbide Corporation. Method and apparatus for packaging large size bags in cartons. 3,919,827, Cl. 53-21.0FW.

Larson, Robert A.: *See—*
Barnum, Thomas G.; Hessler, Frank; and Larson, Robert A., 3,920,216.

Lasco, Inc.: *See—*
Pluenneke, Ricks H.; and Dykes, Willis G., 3,919,806.

Laufer, Siegmar; and Roy, Waldemar, to Deutsche Gold- Und Silber-Scheideanstalt Vormals Roessler. Process of hydrophorizing highly dispersed metal or metalloid oxides. 3,920,865, Cl. 427-220.000.

Laurent, Claude, to Aerail Societe D'Etudes et de Representations, Industrielles Mecaniques et Metallurgiques S.E.R.I.M.M. Overhead railway structure for suspended load carrying devices. 3,919,946, Cl. 104-94.000.

Lavnikanis, Vladimir Fedorovich: *See—*
Arifov, Ubai Arifovich; Kharmats, Dmitry Efimovich; Abdurashidov, Gafur Abdushukurovich; Leontiev, Gennady Andreevich; Zhegallo, Jury Vladimirovich; Parilis, Eduard Simkhovich; Vzenkonsky, Alexandr Vasilievich; Sapon, Anatoly Dmitrievich; Lavnikanis, Vladimir Fedorovich; Kogan, Mark Iosifovich; Egorov, Nikolai Petrovich; and Shaidullin, Abuzar Gabdurakhmanovich, 3,919,742.

Law, Anthony G., to Chase Brass and Copper Co. Electrohydraulically controlled cut off saw. 3,919,906, Cl. 83-294.000.

Laws, Peter: *See—*
Blauert, Jens; and Laws, Peter, 3,920,904.

Layburn, Robert L., to Stromberg-Carlson Corporation. Control circuit for shared telephone call processing equipment. 3,920,924, Cl. 179-18.0AB.

Lazarchik, Robert E.; Roeder, Robert S.; and Runkle, Donald R., to Sperry Rand Corporation. Multiple mode radiometric system with range detection capability. 3,921.169, Cl. 343-5.00R.

Leach, Bruce E.; and Hritz, George G., to Continental Oil Company. Water-insoluble, adherent alumina coatings on hydrophobic surfaces. 3,920,867, Cl. 427-372.000.

Leach, Burleigh H.: *See—*
Saunders, John P.; and Leach, Burleigh H., 3,919,750.

Lear Siegler, Inc.: *See—*
Strader, Don S., 3,920,283.

Leatherbury, William F.: *See—*
Larson, Richard T.; and Leatherbury, William F., 3,919,827.

Lecocq, Francois, to BBC Brown Boveri & Company Limited. Turbine by-pass arrangement for thermal power plants. 3,919,846, Cl. 60-657.000.

Lednikov, Anatoly Ivanovich: *See—*
Goppen, Albert Adolfovich; Nikolaer, Igor Vladimirovich; Dronova, Lidia Mikhailovna; and Lednikov, Anatoly Ivanovich, 3,920,086.

Lee, Lloyd R.: *See—*
Lee, Merle D.; and Lee, Lloyd R., 3,920,225.

Lee, Merle D.; and Lee, Lloyd R., to Raymond Lee Organization, Inc., The, a part interest. Centrifugal chemical mixer. 3,920,225, Cl. 259-22.000.

Lee, Ming Hsing: *See—*
Hirosawa, Frank N.; and Lee, Ming Hsing, 3,920,617.

Lefebvre, Michel S. M., to Omnium de Prospective Industrielle, Societe Anonyme. Process for the manufacture of textile products presenting varied sections. 3,920,866, Cl. 427-224.000.

Lega, Berlando; and Cecchi, Giannangiolo, to Texfluid S.a.s.(Entire). Centrifugal hydroextractor. 3,920,181, Cl. 233-2.000.

Le Gressus, Claude: *See—*
Dubois, Jacques Emile; Lacaze, Pierre Camille; Le Gressus, Claude; and Massignon, Daniel, 3,921,031.

Lehman, Ira S. Support belt. 3,920,008, Cl. 128-96.000.

Lehmann, Helmuth: *See—*
Lehmann, Rolf; and Lehmann, Helmuth, 3,919,753.

Lehmann, Rolf; and Lehmann, Helmuth, to Escher Wyss Limited. Roll. 3,919,753, Cl. 29-113.0AD.

Lehmann, Walter, to Mirabed AG. Method of producing a spring core mattress. 3,920,609, Cl. 264-46.500.

Lehovec, Kurt, to Sprague Electric Company. Induced charge device. 3,921,193, Cl. 357-23.000.

Leimgruber, Willy; and Mohacsi, Ernest, to Hoffmann-La Roche Inc. Preparation of tertiary-butyl aryl ethers. 3,920,746, Cl. 260-584.00C.

Lemelson, Jerome H. Toy molding press. 3,920,368, Cl. 425-195.000.

Lempicki, Alexander: *See—*
Schlafer, John D.; Lempicki, Alexander; Samelson, Harold; and Fowler, Vernon John, 3,920,983.

Lenaerts, George Victor; and Auzins, Eric Egils, to Northern Electric Company Limited. Telephone data set including visual display means. 3,920,926, Cl. 179-90.00B.

Lenczycki, Joseph J. Dental implant assembly and method for attaching the same to the jaw bone. 3,919,772, Cl. 32-10.00A.

Leo Pharmaceutical Products Ltd.: *See—*
Godtfredsen, Wagn Ole, 3,920,817.

Leonard, Donald A.: *See—*
Caristi, Robert F.; Leonard, Donald A.; and Itzkan, Irving, 3,921,097.

Leonard, Verna M. Keyboard instrument hand coordination trainer. 3,919,914, Cl. 84-474.000.

Leontiev, Gennady Andreevich: *See—*
Arifov, Ubai Arifovich; Kharmats, Dmitry Efimovich; Abdurashidov, Gafur Abdushukurovich; Leontiev, Gennady Andreevich; Zhegallo, Jury Vladimirovich; Parilis, Eduard Simkhovich; Vzenkonsky, Alexandr Vasilievich; Sapon, Anatoly Dmitrievich; Lavnikanis, Vladimir Fedorovich; Kogan, Mark Iosifovich; Egorov, Nikolai Petrovich; and Shaidullin, Abuzar Gabdurakhmanovich, 3,919,742.

Lermann, Peter, to AGFA-Gevaert AG. Photographic camera with simplified diaphragm opening mechanism. 3,921,186, Cl. 354-43.000.

Leroy, Jean: *See—*
Lipschutz, Paul; Remontet, Yves; and Leroy, Jean, 3,919,867.

Les Davis Fishing Tackle Co.: *See—*
Davis, Lester M., 3,919,802.

Letson and Burpee Ltd.: *See—*
Allen, Francis Edwin; and Porter, Andrew Wilkinson, 3,919,900.

le Vasseur, Arnold P., to Possis Corporation. Apparatus for automatic production of armatures. 3,920,129, Cl. 214-1.00Q.

Leventer, Robert S.: *See—*
Biswas, Amit Kumar; and Leventer, Robert S., 3,919,873.

Lever Bros. Co.: *See—*
Carson, Phillip Alfred; and Tissington, Peter, 3,920,569.

Lever Brothers Company: *See—*
Curry, Kenneth Vasey; and Sahir, Ahamado Ismail, 3,920,807.

Naik, Appaya Raghunath, 3,920,731.

Leverett, William H., to Durand-Wayland, Inc. Produce coating machine having viscous liquid dispensing means. 3,919,969, Cl. 118-13.000.

Levine, Jules David, to RCA Corporation. Field emitting device and method of making same. 3,921,022, Cl. 313-309.000.

Lewis, Meirion Francis, to Secretary of State for Defence in Her Britannic Majesty's Government of the United Kingdom of Great Britain and Northern Ireland, The. Acoustic wave oscillator. 3,921,093, Cl. 331-1.00A.

Ley, Kurt: *See*—
Beck, Gunther; Doring, Fritz; Holtschmidt, Hans; and Ley, Kurt, 3,920,649.

Lichtenwalter, Glen D.; and Carlson, Sheldon D., to Akzona Incorporated. Thin film evaporation of a crude amide feed in mixture with an alkali metal hydroxide. 3,920,523, Cl. 203-37.000.

Lienert, Jurgen: *See*—
Reiff, Helmut; Lienert, Jurgen; Nast, Roland; Witt, Harro; and Gupta, Pramod, 3,920,598.

Liggett & Myers Incorporated: *See*—
Warfield, Albert H.; Galloway, William Dwight; and Kallianos, Andrew G., 3,920,026.

Liljenberg, Knud, to Slagteriernes Faellesindkobsforening A.m.b.A. Apparatus for injecting fluid into pierceable, fluid-permeable bodies. 3,919,931, Cl. 99-533.000.

Lillja, Harold Vinell: *See*—
Johnson, Claude, Jr.; Ku San-Mei; Lillja, Harold Vinell; and Shih-To Pan, Edward, 3,920,483.

Limbacher, Bernhard, to Fichtel & Sachs AG. Self-aligning clutch release bearing arrangement. 3,920,107, Cl. 192-98.000.

Lind, Henric; and Pihl, Jorgen, to Polypur Forsaljnings AB. Mud scraping device. 3,920,558, Cl. 210-527.000.

Lindner, Ernst: *See*—
Wissmann, Hans; Geiger, Rolf; Lindner, Ernst; and Scholkens, Bernward, 3,920,627.

Lindow, Carl E., to FMC Corporation. Ground isolating circuit. 3,920,925, Cl. 179-78.00R.

Lindroos, Goran: *See*—
Anderson, Lars-Olov; Borg, Hakan Gunnar; Forsman, Nanna; Hanshoff, Gunnar; Lindroos, Goran; Miller-Andersson, Maggie; and Ehrenberg, Elisabeth Charlotte, 3,920,625.

Lindsey, Hiram E.: *See*—
Braddick, Britt O.; and Lindsey, Hiram E., 3,920,075.

Lindsoe, Ogden D. Liquid dispensing structure. 3,920,164, Cl. 222-385.000.

Line, Roy M. Sexual aid. 3,920,007, Cl. 128-79.000.

Linke, Walter R., to Bell & Howell Company. Zoom projection lens. 3,920,315, Cl. 350-184.000.

Liogonkaya, Rakhil Izrailevna: *See*—
Danjushevsky, Solomon Isaakovich; Liogonkaya, Rakhil Izrailevna; and Sudakas, Lev Girshovich, 3,920,466.

Lippert, Axel; Joisten, Siegfried; and Sajben, Johannes-Otto, to Bayer Aktiengesellschaft. Fiber-reinforced plastics tube. 3,920,049, Cl. 138-109.000.

Lipschutz, Paul, to Societe d'Exploitation des Brevets NEIMAN. Lock with push-button operated bolt. 3,919,866, Cl. 70-81.000.

Lipschutz, Paul; Remontet, Yves; and Leroy, Jean, to Societe d'Exploitation des Brevets NEIMAN. Anti-theft safety lock device with means preventing its unallowed removal from the lock-holder. 3,919,867, Cl. 70-186.000.

Lipschutz, Paul, to Societe d'Exploitation des Brevets, NEIMAN. Anti-theft device for machines equipped with a diesel or like engine. 3,919,868, Cl. 70-239.000.

Liszka, Romuald-Jerzy: *See*—
Gatiss, John William; Joynes, Peter Leonard; and Liszka, Romuald-Jerzy, 3,920,401.

Litchford, George B., to Litchstreet Co. Proximity indication with range and bearing measurements. 3,921,172, Cl. 343-16.00R.

Litchstreet Co.: *See*—
Litchford, George B., 3,921,172.

Littrell, Woodrow H.: *See*—
Isaak, Robert D.; and Littrell, Woodrow H., 3,921,174.

Livermore, David L.; Skelly, Peter; and Proctor, D. Frederic, to Proctor & Associates Company. Sonic signal generator and housing. 3,921,016, Cl. 310-9.100.

Lloyd A. Fry Roofing Company: *See*—
Bradley, Robert C., 3,919,823.

Lloyd, Raymond A.: *See*—
Hardesty, Samuel J., Jr.; and Lloyd, Raymond A., 3,921,139.

Loft, John T.: *See*—
Druin, Melvin L.; Loft, John T.; and Plovan, Steven G., 3,920,785.

Logging Development Corporation: *See*—
Hamilton, Douglas D.; and Boivin, Joseph J. R., 3,920,057.

Lohmer, Karl: *See*—
Nittel, Fritz; Lohmer, Karl; and Kolberg, Helmut, 3,920,456.

Lonstrup, Thorkild F.: *See*—
Steere, David E.; and Lonstrup, Thorkild F., 3,920,414.

Loose, Robert A.; and Brown, William W., to Westinghouse Electric Corporation. Protection system for a nuclear reactor. 3,920,513, Cl. 176-20.000.

Lopez, Jose, to Camilo Muebles, Inc. Convertible desk and secretarial return. 3,920,298, Cl. 312-195.000.

Lopez, Manuel: *See*—
Bourassa, Joseph R.; and Lopez, Manuel, 3,919,736.

L'Oreal: *See*—
Kalopissis, Gregoire; Bugaut, Andree; and Zorayan, Vahan, 3,920,710.

Losee, Jon R., to United States of America, Navy. Sonic decompression. 3,920,011, Cl. 128-204.000.

Lovisa, Peter R.; Tausanovitch, Dusan; and Lovisa, Tullio E. Exterior form spreader system for threaded end concrete ties. 3,920,214, Cl. 249-40.000.

Lovisa, Tullio E.: *See*—
Lovisa, Peter R.; Tausanovitch, Dusan; and Lovisa, Tullio E., 3,920,214.

Lowery, James R., to United States of America, National Aeronautics and Space Administration. Panel for selectively absorbing solar thermal energy and the method of producing said panel. 3,920,413, Cl. 29-197.000.

LRC, Inc.: *See*—
Williams, Heyward Sturges, 3,921,106.

Lubeck, Hermann, to August Kolbus. Gluing apparatus. 3,919,971, Cl. 118-259.000.

Lubrizol Corporation, The: *See*—
Hayashi, Katsumi, 3,920,700.

Lucak, Ludek: *See*—
Maev, Radko; Zacek, Cestmir; Janak, Petr; Strecha, Jan; Duzy, Josef; and Lucak, Ludek, 3,919,875.

Lucas Aerospace Limited: *See*—
Haigh, Richard Woolliscroft, 3,919,923.

Lucas, Klaus Jurgen: *See*—
Hammer, Klaus; Porrmann, Herbert; and Lucas, Klaus Jurgen, 3,920,868.

Luhdorff, Dieter; Weise, Lutz; Reinecke, Erich; and Klatt, Alfred, to WABCO Westinghouse GmbH. Antiskid brake control system having malfunction protection. 3,920,280, Cl. 303-21.0AF.

Lukas, Frederic, to Bell Telephone Laboratories, Incorporated. Hotel PBX electronic message billing arrangement. 3,920,911, Cl. 179-7.1TP.

Lum, Sam: *See*—
Miller, Gerald K.; and Lum, Sam, 3,921,125.

Lumi-Tek, Inc.: *See*—
Ellis, Donovan K.; and Ryan, William P., 3,920,320.

Lummus Company, The: *See*—
Riegel, Herbert; Schindler, Harvey D.; Sze, Morgan C.; and Brooks, Maurice E., 3,920,764.

Lund, Ernest Kenneth, to Edgar Pickering (Blackburn) Limited. Looper or needle eccentric adjustment means for tufting machines. 3,919,952, Cl. 112-79.00R.

Lund, Lloyd J., to Cutter Laboratories, Inc. Adjuvant compositions. 3,920,811, Cl. 424-88.000.

Lund, Richard M.: *See*—
Godwin, Stanley J.; and Lund, Richard M., 3,919,726.

Lundsager, C. Bent: *See*—
Barber, Robert C.; Bettacchi, Robert J.; Lundsager, C. Bent; and Wood, Louis L., 3,920,877.

Lundstrom, Rickard Verner; Lagerstrom, Curt Lennart; and Savas, Gunnar, to Kommanditbolaget Rigulag AB & Co. Transportation cart. 3,920,258, Cl. 280-33.99H.

Lurssen, Klaus: *See*—
Metzger, Carl; Jager, Gerhard; and Lurssen, Klaus, 3,920,727.

Luste, Oleg Yanovich: *See*—
Anatychuk, Lukyan Ivanovich; Dimitraschuk, Valentin Trofimovich; and Luste, Oleg Yanovich, 3,920,480.

Lutz, Albert William; and Diehl, Robert Eugene, to American cyanamid Company. N-sec-alkyl-2,6-dinitro-3,4-xylidine herbicides. 3,920,742, Cl. 260-577.000.

Luzio, Guillermo F., to Xerox Corporation. Method and apparatus for maintaining substantially constant torque in a web transport apparatus. 3,921,043, Cl. 318-7.000.

Luzzi, John J.: *See*—
Ramey, Chester E.; and Luzzi, John J., 3,920,659.
Ramey, Chester E.; and Luzzi, John J., 3,920,661.
Spivack, John D.; and Luzzi, John J., 3,920,712.

Lye, Stephen Walter, to Bell Telephone Laboratories, Incorporated. Line control circuit. 3,920,928, Cl. 179-99.000.

Lykes Bros. Steamship Co., Inc.: *See*—
Amoss, Walter J., Jr., 3,919,960.
Nemec, Frank A.; Thayer, Stuart W.; Eckert, William S.; Horn, Marion F.; and Dunn, Roland J., Jr., 3,919,959.

Lynch, Henry W.: *See*—
Sanders, David H.; Lynch, Henry W.; and Uy, Sennen, 3,919,724.

Lynes, Inc.: *See*—
Coone, Malcolm G.; and Miller, Stanley D., 3,919,850.

Lyon, Randolph S., Jr., to Kurt H. Volk, Inc. Multiple folding booklets. 3,920,267, Cl. 281-16.000.

M. A. Gedney Company: *See*—
Zellman, Roger P., 3,919,828.

M.M.S. Limited: *See*—
Schindler, Herbert; and Ware, Willard O., 3,920,067.

M & P Pipe Jacking Corporation: *See*—
Plourde, Maurice J., 3,919,851.

Ma, Carlton Y. W.; and Ailman, Edwin Dean, to Cincinnati Milacron Inc. Mold pressure control apparatus. 3,920,367, Cl. 425-149.000.

Ma-De Inc.: *See*—
Mason, Barry D., 3,920,030.

Maaz, Karl, to Siemens Aktiengesellschaft. Arrangement for making metallic connections between circuit points situated in one plane. 3,919,767, Cl. 29-628.000.

Mach, Wolfgang: *See—*
Augart, Dietmar; Mach, Wolfgang; and Scheuermann, Horst, 3,920,704.

Machlett Laboratories, The: *See—*
Kirkendall, Thomas D.; and Doolittle, Howard D., 3,920,984.

MacLean-Fogg Lock Nut Co.: *See—*
Grube, William L., 3,920,059.

Maev, Radko; Zacek, Cestmir; Janak, Petr; Strecha, Jan; Duzy, Josef; and Lucak, Ludek, to Kralovopolska strojirna, narodni podnik. Method of and apparatus for making high pressure tube bends, especially for the chemical industry. 3,919,875, Cl. 72-369.000.

Maggiacomo, William D.; and Winslow, Fred A., to William D. Maggiacomo. Compressed air dryer-handle attachment filter. 3,920,189, Cl. 239-526.000.

Magnetic Engineering Associates, Inc.: *See—*
Marston, Peter G.; and Nolan, John J., 3,920,543.

Magrini Galileo S.p.A.: *See—*
Ciboldi, Pietro; and Bellone, Giulio, 3,920,939.

Magsat Corporation: *See—*
Lapointe, Lloyd J., 3,920,943.

Mahan, John E.; and Gardner, Lloyd E., to Phillips Petroleum Company. Oligomerization process. 3,920,722, Cl. 260-465.80D.

Maher, Galeb H.: *See—*
Eror, Nicholas G.; Burn, Ian; and Maher, Galeb H., 3,920,781.

Mahoney, Donald Edwin, to RCA Corporation. Frequency multiplier circuit. 3,921,056, Cl. 321-69.0NL.

Maier, Vincent P.: *See—*
Hasegawa, Shin; Brewster, Linda C.; and Maier, Vincent P., 3,920,851.

Major, Douglas James, to Dunlop Limited. Fluid release valve. 3,920,032, Cl. 137-68.000.

Makita, Hiroomi, to Toyoda Kikai Kogyo Kabushiki Kaisha. Pile driving and drawing apparatus. 3,920,083, Cl. 173-49.000.

Malmin, Oscar. Endodontic sealing system and apparatus. 3,919,775, Cl. 32-57.000.

Manguso, Jerry R., to Weber, Gene, a part interest. Buoyant fish basket. 3,919,803, Cl. 43-55.000.

Mann, Elton W., to Research Corporation. Method for controlling tobacco mosaic virus disease. 3,920,812, Cl. 424-115.000.

Mannesmannröhren-Werke AG: *See—*
Wassen, Johann; and Hesse, Josef, 3,919,870.

Manoni, Albert J.: *See—*
Chovan, Joseph L.; and Manoni, Albert J., 3,920,951.

Marathon Oil Company: *See—*
Argabright, Perry A.; Echelberger, Larry M.; and Phillips, Brian L., 3,920,545.

Marek, Alois, to BBC Brown Boveri & Company Limited. Demodulator circuit for amplitude-modulated signals including diodes with like poles interconnected and a current source biasing the diodes in their forward conducting direction. 3,921,086, Cl. 329-204.000.

Mariani, Luigi: *See—*
Fontanella, Luigi; and Mariani, Luigi, 3,920,660.

Marien, Jacques: *See—*
Giraud, Philippe; and Marien, Jacques, 3,921,163.

Marino, Salvatore M.: *See—*
Kloos, William W.; Osterkorn, Charles L.; and Marino, Salvatore M., 3,920,887.

Marion, Charles P., to Texaco Development Corporation. Production of methanol. 3,920,717, Cl. 260-449.500.

Markfelt, Reinhold S.: *See—*
Colburn, Edward N.; and Markfelt, Reinhold S., 3,920,170.

Markowski, Stanley J., to United Technologies Corporation. Combustion chamber for dissimilar fluids in swirling flow relationship. 3,919,840, Cl. 60-39.650.

Marleau, Robert E. Drill drifting device. 3,919,759, Cl. 29-254.000.

Marlin, Donald H.: *See—*
Selmeczi, Joseph G.; Marlin, Donald H.; and Kestner, Daniel W., 3,920,795.

Marmion, Joseph D.: *See—*
Bishop, Sarah-Ann; Marmion, Joseph D.; and Montante, Alan R., 3,920,896.

Marmo, Don; and Rocco, Frank Louis, to International Flavors & Fragrances Inc. Chewing gum containing flavor composition. 3,920,849, Cl. 426-3.000.

Marotta Scientific Controls, Inc.: *See—*
Kowalski, Slawomir, 3,921,111.

Marrapodi, Ernest John. Tissue sterilizing apparatus. 3,920,394, Cl. 21-76.000.

Mars, Inc.: *See—*
Greene, Walter John, 3,921,003.

Marshall, J. Howard, III, to MDH Industries Inc. Wide-range current-to-frequency converter. 3,921,012, Cl. 307-271.000.

Marston, Peter G.; and Nolan, John J., to Magnetic Engineering Associates, Inc. Moving matrix magnetic separator. 3,920,543, Cl. 209-222.000.

Martelli, Nerio, to Solvay & Cie. Packaging under heat-shrunk film. 3,920,123, Cl. 206-497.000.

Martin, Daniel T.; Serrell, Morton A.; Coleman, Herbert C.; Cooper, Donald L.; Knox, Robert M.; Barnfield, Curtis L.; and Walinchus, Robert J., to TRW Inc. Computerized traffic control apparatus. 3,920,967, Cl. 235-150.240.

Martin, Leroy, to Pennwalt Corporation. Preparation of methane sulfonyl fluoride. 3,920,738, Cl. 260-543.00F.

Martin, Lionel C.: *See—*
Bundschuh, Robert L., 3,920,263.

Martin Marietta Corporation: *See—*
Meszaros, Laszlo A., 3,920,709.
Williams, Laurence O.; and Anselmi, Robert T., 3,921,002.

Martin, Otis M.; Kough, John K.; and Miller, Silas N., to Ditz-Crane. Roofing panel and assembly and method. 3,919,822, Cl. 52-540.000.

Martin, Wilhelm N.: *See—*
Wilkinson, Michael C.; Blais, Leo; Martin, Wilhelm N.; and Tesainer, Silvano, 3,920,496.

Maruta, Isao: *See—*
Nakashio, Seizo; Maruta, Isao; Hayatsu, Kazuo; and Kono, Yoichi, 3,920,770.

Maschinenfabrik Augsburg-Nurnberg AG: *See—*
Simon, Michael; and Geyer, Werner, 3,919,947.

Maskery, Arthur, to Westinghouse Brake & Signal Co., Ltd. Rail train vehicle brake control apparatus utilizing common analog control and A.C. supply signals. 3,920,285, Cl. 303-22.00R.

Maslov, Vladimir Mikhailovich: *See—*
Nabiullin, Faat Khatovich; Buzova, Zoya Mikhailovna; Gertsik, Efim Mikhailovich; Koval, Ivan Ivanovich; Maslov, Vladimir Mikhailovich; and Khamits, Ljudmila Nikolaevna, 3,920,475.

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McAlister, Edgar O. Nail holder. 3,919,903, Cl. 81-419.000.

McAlister, Edgar O. Repeating self projecting band type apparatus. 3,919,996, Cl. 124-19.000.

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McClearn, Carl Meade, Jr.; and Miller, Thomas Alva Edison, to International Business Machines Corporation. Semi static time division multiplex slot assignment. 3,921,137, Cl. 340-147.00R.

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McCoy, Frederic C.; and Brandenburg, John T., to Texaco Inc. Method of treating oils to remove contaminants of sulfur nitrogen and color bodies. 3,920,540, Cl. 208-248.000.

McCoy, Michael R.; and Walther, Terry R., to Electronic Arrays, Inc. Mosfet clock. 3,921,101, Cl. 331-108.00D.

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Metzger, Carl; Jager, Gerhard; and Lurssen, Klaus, to Bayer Aktiengesellschaft. Novel N-arylcarbamic acid esters. 3,920,727, Cl. 260-471.00C.
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Meyer, Horst; Bossert, Friedrich; Vater, Wulf; and Stoepel, Kurt, to Bayer Aktiengesellschaft. Use of unsymmetrical esters of N-substituted 1,4-dihydropyridine 3,5-dicarboxylic acid as cardiovascular agents. 3,920,823, Cl. 424-266.000.
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Moore, William M. Angle trisector. 3,919,777, Cl. 33-1.0AP.

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Moorehead, Thomas J., to GTE Automatic Electric (Canada) Limited. Status detector fault detector. 3,920,933, Cl. 179-175.20C.

Moorehead, Thomas J., to GTE Automatic Electric (Canada) Limited. Idle/busy status detector for a telephone switching network. 3,920,934, Cl. 179-175.20R.

Moran, Robert F.; and Sanders, Darryl W. Omnidirectionally steerable vehicle. 3,920,093, Cl. 180-21.000.

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Morio, Minoru; and Nakagawa, Yutaka, to Sony Corporation. Electron beam deflection circuit. 3,921,036, Cl. 315-396.000.

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Morris, Sammie R., Jr. Composition for application to plant material and method of making same. 3,920,858, Cl. 426-319.000.

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Schwan, Thomas J., 3,920,666.
Spencer, Claude F., 3,920,650.

Moseley, John T.: *See—*
Anbar, Michael; and Moseley, John T., 3,920,987.

Mosier, James A., to Modine Manufacturing Company. Heat exchanger. 3,920,069, Cl. 165-150.000.

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Orgill, Rodney H., 3,921,011.
Pille, Hans J., 3,921,200.

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Moultón, Marc L.: *See—*
Woodworth, William H.; and Moulton, Marc L., 3,920,199.

Muehllehner, Gerd, to G. D. Searle & Co. Gamma ray camera system with corrugated collimators. 3,921,000, Cl. 250-505.000.

Mueller, David Willis: *See—*
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Mueller, Johannes: *See—*
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Mules, Richard D., to Du Pont de Nemours, E. I., and Company. Apparatus for making polymeric film. 3,920,365, Cl. 425-141.000.

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Donnelly, Thomas L.; and Mullen, Edward J., 3,920,952.

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Muller, Karl-Heinz, to Siemens Aktiengesellschaft. Graphic display of raster scanning system output signals. 3,920,890, Cl. 178-6.800.

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Alig, Leo; Furst, Andor; Keller, Peter; Muller, Marcel; Kerb, Ulrich; and Wiechert, Rudolf, 3,920,703.

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Munden, Curtis D., to General Motors Corporation. Ignition system for rotary internal combustion engines. 3,919,994, Cl. 123-148.0DS.

Munson, Robert E., to Ball Brothers Research Corporation. Microstrip antenna structures and arrays. 3,921,177, Cl. 343-846.000.

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Murray, Harry C. Ready stored power cord. 3,920,308, Cl. 339-119.00C.

Murray, James L.; and Sires, Lawrence M., to United States of America, Navy. Method and means for flash suppression. 3,919,939, Cl. 102-7.200.

Murray, John C.: *See—*
Reich, Stanley; and Murray, John C., 3,921,045.

Murre, Robert W.; and Bookless, George W., to Bell & Howell Company. Cartridge or cassette control system with an automatic final run at the end of a web. 3,920,332, Cl. 355-64.000.

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Mutoh Industry Ltd.: *See—*
Komura, Seiichi, 3,920,209.

Mutzhas, Maximilian Friedrich. Illuminated advertising device. 3,919,798, Cl. 40-130.00G.

Myagkov, Alexei Andreevich; Raigorodsky, Mikhail Grigorievich; Uchakin, Viktor Nikolaevich; Khomyakov, Ivan Ivanovich; and Yastrebo, Boris Sergeevich. Digital comparator with multiple references. 3,921,134, Cl. 340-146.200.

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Nabiullin, Faat Khatovich; Buzova, Zoya Mikhailovna; Gertsik, Efim Mikhailovich; Koval, Ivan Ivanovich; Maslov, Vladimir Mikhailovich; and Khamits, Ljudmila Nikolaevna. Alkaline galvanic cell. 3,920,475, Cl. 136-86.00A.

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Naegeli, Peter, to Givaudan Corporation. Hydroazulenones. 3,920,747, Cl. 260-586.00C.

Nagai, Shigeki: *See—*
Tahara, Susumu; Nagai, Shigeki; Hayashi, Yurio; Hoshide, Kou; Kawazoe, Shigenori; Harada, Katsuzo; and Yamamoto, Koichi, 3,920,756.

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Nagoshi, Shuichi, to Mitsui Shipbuilding and Engineering Co., Ltd. Bucket device for rocker shovel. 3,920,139, Cl. 214-765.000.

Naik, Appaya Raghunath, to Lever Brothers Company. Detergent compounds. 3,920,731, Cl. 260-485.00H.

Nakabe, Ryuhei: *See—*
Fujiwara, Yoshihiro; and Nakabe, Ryuhei, 3,921,205.

Nakagawa, Junyo; Ohno, Yoshikata; Esaki, Tamemaru; and Ueda, Keizo, to Kuraray Co. Ltd. Method for producing crimped fibers. 3,920,784, Cl. 264-168.000.

Nakagawa, Yutaka: *See—*
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Nakamura, Zenzo, to Canon Kabushiki Kaisha. Stroboscopic device with electric shock preventive circuit. 3,921,034, Cl. 315-241.00P.

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Suda, Hideaki; Kanda, Tatsuo; Tomita, Hiroshige; Nakanishi, Hirotoshi; Hida, Hiromu; and Nuno, Tatsumi, 3,920,739.

Nakanishi, Michio; Tahara, Tetsuya; Araki, Kazuhiko; and Shiroki, Masami, to Yoshitomi Pharmaceutical Industries, Ltd. Thienodiazepine compounds. 3,920,679, Cl. 260-309.000.

Nakashio, Seizo; Maruta, Isao; Hayatsu, Kazuo; and Kono, Yoichi, to Sumitomo Chemical Company, Ltd. Rubber modified polyphenylene oxide composition. 3,920,770, Cl. 260-897.00R.

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Nakata, Josuke, to Mitsubishi Denki Kabushiki Kaisha. Electronic thermally sensitive switch device. 3,920,955, Cl. 219-501.000.

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Ishii, Hirokazu; and Nakata, Katsumi, 3,921,110.

Nakata, Roy, to General Electric Company. High-voltage, compressed-gas-insulated bus. 3,920,885, Cl. 174-28.000.

Nakata, Toyotaro, to Tonka Corporation. Traveling toy. 3,919,804, Cl. 46-206.000.

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Nakazawa, Yuji: *See—*
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Newkirk, John D., 3,920,546.
Piecuch, John A., 3,920,056.
Svarz, Jerry J.; Goretta, Louis A.; and Seale, Virgil L., 3,920,740.

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Narbaits-Jaureguy, Jean-Raymond; and Billottet, Henri, to Thomson-CSF. Vehicle danger indicating system. 3,921,127, Cl. 340-32.000.

Naso, Anthony C.: *See—*
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Nast, Roland: *See—*
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Nath, Gunther. Flexible light guide. 3,920,980, Cl. 240-1.0LP.

National Gypsum Company: *See—*
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National Patent Development Corporation: *See—*
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National Research Development Corporation: *See—*
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Neeff, Rutger: *See—*
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Neidermyer, Robert W.: *See—*
Brewer, Arthur D.; Neidermyer, Robert W.; and McIntire, William S., 3,920,438.

Nelson Holland, Henry A., to Raymond International, Inc. Drag trowel with counterweight means. 3,920,363, Cl. 425-95.000.

Nelson, Howard I., to Crompton & Knowles Corporation. Terry warp feeding apparatus. 3,920,052, Cl. 139-25.000.

Nelson, Norman A., to Upjohn Company, The. 4-Oxaprostaglandin E-type compounds. 3,920,723, Cl. 260-468.00D.

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Rajadhyaksha, Vithal Jagannath, 3,920,824.

Nemec, Frank A.; Thayer, Stuart W.; Eckert, William S.; Horn, Marion F.; and Dunn, Roland J., Jr., to Lykes Bros. Steamship Co., Inc. Barge with releasable supports. 3,919,959, Cl. 114-26.000.

Nemeth, Jozsef: *See—*
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Nercessian, Sarkis: *See—*
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Nery, Victor W.: *See—*
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Neschke, Rex Harding; and Zimmerer, John Louis, to McCulloch Corporation. Automatic decompression device. 3,919,991, Cl. 123-182.000.

Nessel, Robert J.; and Blodinger, Jack, to Merck & Co., Inc. Growth promoting subcutaneous compositions. 3,920,806, Cl. 424-22.000.

Nesterova, Lilia Mikhailovna: *See—*
Golyshin, Nikolai Mikhailovich; Andreeva, Elena Ivanovna; Dvoichenkova, Elza Alexandrovna; Ukrainets, Nina Sergeevna; Skazkina, Tatyana Pavlovna; Solovieva, Galina Viktorovna; Bodrova, Margarita Romanovna; Rotastikova, Nina Alexandrovna; Melnikov, Nikolai Nikolaevich; Kukalenko, Stepan Sofronovich; Nuridzhanian, Karen Armenakovich; Nesterova, Lilia Mikhailovna; Usmanov, Marat Tashpulatovich; Novikova, Raisa Grigorievna; Kuznetsova, Galina Vladimirovna; Volodkovich, Stepan Dmitrievich; Burmakin, Nikolai Mikhailovich; Obukhova, Valentina Ivanovna; Monova, Violetta Ivanovna; Shkuratova, Galina Nikonovna; Sanin, Mikhail Arsenievich; Kulagina, Natalya Nikolaevna; and Mironova, Nina Evgenievna, 3,920,680.

Netta, Louis A., to Thomas & Betts Corporation. Tool. 3,919,877, Cl. 72-456.000.

Netzel, Philip C.; Brandt, Thomas F.; and Strack, Harold F., to I-T-E Imperial Corporation. High voltage circuit breaker unitary pole moldings. 3,920,938, Cl. 200-50.0AA.

Neuman, John G., to General Motors Corporation. Internal combustion engine coordinated dual action inductive discharge spark ignition system. 3,919,993, Cl. 123-148.00E.

Newkirk, John D., to Nalco Chemical Company. N,N,N,N,N,N Hexaalkyl-beta-hydroxytrimethylene diammonium dihalides. 3,920,546, Cl. 210-54.000.

Neyret, Guy, to Etablissements Genoud & Cie Societe Anonyme. Assembly of the flint spring of a gas lighter. 3,920,379, Cl. 431-276.000.

Nichol, George D.; and Schmidt, John C. Shroud for coiled hoses. 3,920,050, Cl. 138-110.000.

Nichols, Richard A.; and Swindler, Henry A., to Parker-Hannifin Corporation. Apparatus for melting ice in a gasoline vapor recovery system. 3,919,857, Cl. 62-272.000.

Nickl, Josef; Teufel, Helmut; Engel, Wolfhard; Seeger, Ernst; and Engelhardt, Gunther, to Boehringer Ingelheim GmbH. Antiphlogistic 1-(hydroxy or carboxylic acyloxy)-3-(2'-halo-4-biphenylyl). 3,920,668, Cl. 260-295.00R.

Nicklasson, Billy: *See—*
Wildt-Persson, Fredrik; and Nicklasson, Billy, 3,920,776.

Nicks, Peter Francis; and Ryan, William Anthony, to Imperial Chemical Industries Limited. Paint compositions and method of their production. 3,920,597, Cl. 260-22.00R.

Nickstadt, Gerhard A.: *See—*
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Nielson, Carl Calvin: *See—*
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Nieuwenhoven, Hendricus Jacobus Cornelis: *See—*
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Nihon Denshi Kabushiki Kaisha: *See—*
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Nikolaer, Igor Vladimirovich: *See—*
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Nilsson, Hans Robert, to Svenska Rotor Maskiner Altiebolag. Gear arrangement for maintaining continuous contact between flanks of a power rotor and cooperating sealing means on an abutment member in a rotary combustion engine. 3,920,361, Cl. 418-191.000.

Nilsson, Karl Erik. Device in connection with roller safety belts or similar. 3,920,265, Cl. 280-150.0SB.

Nippon Electric Company, Ltd.: *See—*
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Yonezu, Hiroo, 3,920,491.
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Nippon Kogaku K.K.: *See—*
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Nippon Shokubai Kagaku Kogyo Co., Ltd.: *See—*
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Nippon Steel Corporation: *See—*
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Nippon Tsu Shin Kogyo K.K.: *See—*
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Nippon Zeon Co., Ltd.: *See—*
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Handa, Susumu; Tanaka, Yoshiaki; Nishibata, Atsushi; and Inamoto, Yoshiaki, 3,920,644.

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Nishitani, Tatsuro, to Nihon Kyozu Kabushiki Kaisha. Apparatus for projecting an object. 3,920,323, Cl. 353-61.000.

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Nissan Motor Company, Limited: *See—*
Endo, Toshiaki; Takao, Masateru; Abe, Nobuhiro; Wakita, Shuhei; and Kamata, Haruo, 3,920,111.

Nittel, Fritz; Lohmer, Karl; and Kolberg, Helmut, to AGFA-Gevaert Aktiengesellschaft, DT. Photographic elements containing a matt layer. 3,920,456, Cl. 96-87.00R.

Nittel, Herman: *See—*
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Nitto Boseki Co., Ltd.: *See—*
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Nixdorf Computer AG: *See—*
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Noeske, Heinz: *See—*
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Nolan, John J.: *See—*
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Nomura, Takao: *See—*
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Nordon Industries, Inc.: *See—*
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Nordsiek, Karl-Heinz: *See—*
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Norimoto, Yuh; Ohmura, Shigeru; Shimizu, Yoshiaki; and Tatano, Toshio. Enzymatic hydrolysis of ribonucleic acid. 3,920,519, Cl. 195-28.00N.

Norman, Ralph L.: *See—*
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Northern Electric Company Limited: *See—*
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Northrop Corporation: *See—*
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Norton, Richard V., to Sun Ventures, Inc. Process for hydrolysis of nitriles. 3,920,670, Cl. 260-295.50R.

Nottke, James E., to Du Pont de Nemours, E. I., and Company. Method of making α,α-difluoroisocyanates. 3,920,718, Cl. 260-453.00P.

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Novex RT: *See—*
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Nuclear Battery Corporation: *See*—
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Nuclear Power Group Limited, The: *See*—
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Nuno, Tatsumi: *See*—
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Nussmeier, Thomas A.: *See*—
Abrams, Richard L.; and Nussmeier, Thomas A., 3,921,099.

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Oberkirch, Wolfgang: *See*—
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O'Brien, Darrell E.: *See*—
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O'Connor, Arthur H., to Time Computer, Inc. Pushbutton for solid state wristwatch. 3,921,108, Cl. 335-153.000.

Oda, Mitsuo: *See*—
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Odenthal, Conrad John, to Tektronix, Inc. Dual-beam CRT with vertical trace bowing correction means. 3,921,025, Cl. 313-437.000.

Odetics, Inc.: *See*—
Primosch, Herbert F.; and Fisher, Allen E., 3,921,220.

O'Donnell, William; and Carr, Leslie. Anti-theft system employing coincidence switch with easily-changed combination. 3,921,130, Cl. 340-64.000.

Offerman, Michael: *See*—
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Offshore Company, The: *See*—
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Ogura, Setsuo; and Sato, Naonobu, to Hitachi, Ltd. Method of manufacturing semiconductor device. 3,920,484, Cl. 148-1.500.

Ohmura, Shigeru: *See*—
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Okey, Bernard J., to BASF Aktiengesellschaft. Trisequential color video record-playback method and circuits. 3,921,203, Cl. 358-9.000.

Oku, Takeshi: *See*—
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Olin Corporation: *See*—
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Olinger, John B., Jr.; and Wahl, Roger L., to United Technologies Corporation. Gas dynamic laser having shutter doors. 3,921,100, Cl. 331-94.50D.

Oliver, Wayne H. Self locking panel connector. 3,919,819, Cl. 52-233.000.

Ollinger, James C., to Armstrong Cork Company. Carpet-faced wallboard. 3,920,872, Cl. 428-95.000.

Olsen, Carl Ivar, to Danfoss A/S. Limit switch means, particularly for hydraulic steering circuits. 3,920,217, Cl. 251-57.000.

Olsen, Jarle Asbjorn. Tracheostomatic bandage. 3,920,009, Cl. 128-140.00R.

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Olympic Machine, Inc.: *See*—
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Olympus Optical Co., Ltd.: *See*—
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Onoda, Takeru; Tsunoda, Yoshitoshi; Nomura, Takao; Nonaka, Takehisa; and Masuyama, Tetsuo, to Mitsubishi Chemical Industries Limited. Process for recovering noble metal. 3,920,449, Cl. 75-97.00R.

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Ophir, David; Shapiro, Marvin; and Komusin, Bruce, to Ontel Corporation. Business machine communication system and data display. 3,921,148, Cl. 340-172.500.

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Padgitt, Kenneth W., to Borg-Warner Corporation. Solid state control for hospital bed motors. 3,921,048, Cl. 318-480.000.

Paine, G. William, to Joerns Furniture Company. Hidden adjustment means for a bed. 3,919,727, Cl. 5-63.000.

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Pellerin Milnor Corporation: *See—*
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Pennsylvania Engineering Corporation: *See—*
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Perronnet, Jacques; and Girault, Pierre, to Roussel UCLAF. Methods of combatting fungi and bacteria using α-chloro-α-isonitrosoacetophenone. 3,920,841, Cl. 424-327.000.
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Personal Products Company: *See—*
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Petrocarbon Developments Limited: *See—*
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Petrzilka, Theodore. 6a,10a-Trans-6a,10,10a-tetrahydrodibenzo(b,d)-pyrans. 3,920,705, Cl. 260-345.300.
Pexa, Guenther, to Siemens Aktiengesellschaft. Arrangement for carrier recovery in carrier frequency video and data transmission systems. 3,921,073, Cl. 325-50.000.
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Piggott, David C., to PCL Industries Limited. Apparatus for feeding polymeric material in flake form to an extruder. 3,920,229, Cl. 259-192.000.
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Pittie, Willem Hubert; Overbeek, Gerhardus; and Doig, Kingsley Ferguson, to Swarsab Mining, Exploration & Development Company (Proprietary) Limited. Separating and purification of platinum group metals and gold. 3,920,790, Cl. 423-22.000.
Pittman, Richard D.; Grossman, Norman J.; and Johnson, Ronald E., to Northrop Corporation. Method of tunnel containing structures. 3,919,768, Cl. 29-604.000.

Pittman, Robert D.; and Offerman, Michael, to Industrial Electronic Hardware Corporation. Low force insertion connector. 3,920,303, Cl. 339-91.00R.

Pitton, Oscar, to Swiss Aluminium Ltd. Process for coloring aluminum black. 3,920,488, Cl. 148-6.270.

Plasser, Erma; Theurer, Josef; Schubert, Egon; and Riessberger, Klaus. Track surfacing method. 3,919,943, Cl. 104-7.00R.

Ploger, Manfred; and Stieding, Lothar, to Siemens Aktiengesellschaft. Explosive-activated plug. 3,919,940, Cl. 102-24.00R.

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Plourde, Maurice J., to M & P Pipe Jacking Corporation. Apparatus for the excavation and lining of subterranean tunnels. 3,919,851, Cl. 61-85.000.

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Pompei, Jean, to R.T.C. La Radiotechnique-Compelec. Light filter and process for producing the same. 3,920,533, Cl. 204-192.000.

Pondelicek, William J.; and Schmidt, Vernon F., to Heich Die Casting Corporation. Apparatus for lubricating a die structure employed in die casting operations. 3,920,099, Cl. 184-55.00A.

Pontigny, Jacques A., to Coulter Electronics, Inc. Particle counting apparatus including isolated manometer. 3,921,006, Cl. 307-118.000.

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Porret, Daniel; and Habermeier, Jurgen, to Ciba-Geigy Corporation. Dialkoxyphosphonalkyl derivatives of cyclicureides containing glycidyl groups. 3,920,685, Cl. 260-309.500.

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Precision Fukuhara Works, Ltd.: *See—*
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Precitec Gesellschaft fur Prazisionstechnik und Elektronik: *See—*
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Price, Sidney M., to Erie Industrial Insulation Corporation. Portable urethane spray gun. 3,920,188, Cl. 239-403.000.

Primosch, Herbert F.; and Fisher, Allen E., to Odetics, Inc. Apparatus for automatic high speed positioning of magnetic recording tape by sensing reel revolutions from tape beginning. 3,921,220, Cl. 360-72.000.

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Pronk, Karel M. A.; and Sie, Swan T., to Shell Oil Company. Demetallation with nickel-vanadium on silica in a hydrocarbon conversion process. 3,920,538, Cl. 208-89.000.

Propst, Robert L.; and Kelley, James O., to Herman Miller, Inc. Laboratory module system. 3,920,299, Cl. 312-223.000.

Pugh, Stanley Frederick, to United Kingdom Atomic Energy Authority. Supports for catalyst materials. 3,920,583, Cl. 252-465.000.

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R.T.C. La Radiotechnique-Compelec: *See—*
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Radlove, Sol B., to Continental Can Company, Inc. Process for stabilized ethylenically unsaturated beta-hydroxy esters. 3,920,732, Cl. 260-486.00B.

Raigorodsky, Mikhail Grigorievich: *See—*
Myagkov, Alexei Andreevich; Raigorodsky, Mikhail Grigorievich; Uchakin, Viktor Nikolaevich; Khomyakov, Ivan Ivanovich; and Yastrebo, Boris Sergeevich, 3,921,134.

Rajadhyaksha, Vithal Jagannath, to Nelson Research & Development Co. Stable ophthalmic formulation. 3,920,824, Cl. 424-274.000.

Ralston Purina Company: *See—*
Middendorf, John Edward; Waggle, Doyle Hans; and Cornell, Alan, 3,920,853.

Rama Corporation: *See—*
Beasley, Robert E.; and Hannah, Robert W., 3,920,963.

Ramey, Chester E.; and Luzzi, John J., to Ciba-Geigy Corporation. Certain alkyl alkanoate derivatives of substituted piperazino-diones. 3,920,659, Cl. 260-268.0TR.

Ramey, Chester E.; and Luzzi, John J., to Ciba Geigy Corporation. Hindered piperidine carboxylic acids, metal salts thereof and stabilized compositions. 3,920,661, Cl. 260-270.00C.

Ramsey, Robert E.: *See—*
VandenBerg, Willard J.; Ramsey, Robert E.; Pieczko, George; Bollman, Robert L.; and Krackenberger, Richard E., 3,920,541.

Randall, David I.; and Wynn, Robert W., to GAF Corporation. 2-Chloroethylphosphonothioic acids and esters for regulation of plant growth. 3,920,439, Cl. 71-87.000.

Randall, Robert E., to Rowland, Incorporated. Extrusion apparatus using perforated member in discharge passage for producing sheet material with multicolor striated pattern. 3,920,366, Cl. 425-131.100.

Randell, Donald Alan: *See—*
Kunda, Wasyl; and Randell, Donald Alan, 3,920,410.

Randmere, Uno: *See—*
Boehly, Michael A.; and Randmere, Uno, 3,920,901.

Ranft, Eberhard V., to Raymond International, Inc. Mast supporting adjustability device. 3,919,816, Cl. 52-116.000.

Rank Xerox, Ltd.: *See—*
Sugawara, Kiyoshi, 3,920,154.

Rankin, Billy F., to Burton, Parsons and Company, Inc. Polyacrylamide containing ophthalmic solutions. 3,920,810, Cl. 424-80.000.

Ratner, George Irving, to Automatic Close & Lock Corporation. Service system. 3,921,160, Cl. 340-286.000.

Ratzlaff, Harold J., to General Electric Company. Variable resistor assembly. 3,921,118, Cl. 338-89.000.

Rawlins, Wendell G.; Hoffsommer, Gary M.; Artzer, Charles W.; and Parrett, Cecil H. Magnetic sensor for detecting flaws on one surface of roller bearing. 3,921,065, Cl. 324-37.000.

Ray, Basil D.: *See—*
Dowdy, Leroy D.; and Ray, Basil D., 3,920,208.

Ray, Donald R.; and Bozeman, James D., to Offshore Company, The. Floating structure and method of recovering anchors therefor. 3,919,957, Cl. 114-.50D.

Raymond, George A.: *See—*
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Raymond International, Inc.: *See—*
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Raymond Lee Organization, Inc., The: *See—*
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Raytheon Company: *See—*
Shanafelt, Robert E.; Hilton, Richard F.; and Archer, Donald H., 3,921,176.
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Recta Manufacture d'Horlogerie S.A.: *See—*
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Reddy, Junuthula N., to Bendix Corporation, The. Circuit for providing electronic enrichment fuel compensation in an electronic fuel control system. 3,919,981, Cl. 123-32.0EA.

Redmer, Wilbert; Rolin, Kenneth; and Nittel, Herman, to Abbott Laboratories. Apparatus for stripping and unloading a molded part from a mold core. 3,920,374, Cl. 425-436.00R.

Reese, Walter J., to PPG Industries, Inc. Binder applicator for glass fiber coating and method of using. 3,920,431, Cl. 65-3.000.

Reetz, Heinz, deceased: *See—*
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Refol, Didier: *See—*
Lager, Jean-Paul; and Refol, Didier, 3,920,920.

Regan, Barrie F.; Regan, Glen B.; and Regan, Brent F. Apparatus for breaking semiconductor wafers. 3,920,168, Cl. 225-103.000.

Regan, Brent F.: *See—*
Regan, Barrie F.; Regan, Glen B.; and Regan, Brent F., 3,920,168.

Regan, Glen B.: *See—*
Regan, Barrie F.; Regan, Glen B.; and Regan, Brent F., 3,920,168.

Regan, John J. Inflatable body support. 3,919,730, Cl. 5-348.00R.

Regents of the University of Minnesota: *See—*
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Arnaud, Henri; and Hergovalch, Jean Rene, 3,919,843.

Regnier, Albert; Canceill, Bernard Jean Jacques; Kevorkian, Kevork; and Lager, Jean Paul, to International Standard Electric Corporation. Divided time-division switching network. 3,920,914, Cl. 179-15.0AT.

Reich, Siegfried: *See—*
Junk, Dieter; Schlunke, Jurgen; and Reich, Siegfried, 3,920,275.

Reich, Stanley; and Murray, John C., to Bulova Watch Company, Inc. Damped torsional rod oscillator. 3,921,045, Cl. 318-127.000.

Reiff, Helmut; Lienert, Jurgen; Nast, Roland; Witt, Harro; and Gupta, Pramod, to Bayer Aktiengesellschaft. Non-ionic polyurethane dispersions having side chains of polyoxyethylene. 3,920,598, Cl. 260-29.2TN.

Reigel, Stanley A.; and Doyle, Charles D., to Standard Havens, Inc. Evaporative cooler. 3,920,774, Cl. 261-17.000.

Reinecke, Erich: *See—*
Luhdorff, Dieter; Weise, Lutz; Reinecke, Erich; and Klatt, Alfred, 3,920,280.

Reith, William E.; and Overman, John A. Electrical fencing scoring method and apparatus. 3,920,242, Cl. 273-1.00F.

Remberg, Axel, to Kraftwerk Union Aktiengesellschaft. Shaft seal with axial labyrinth for steam turbines. 3,920,251, Cl. 277-53.000.

Remontet, Yves: *See—*
Lipschutz, Paul; Remontet, Yves; and Leroy, Jean, 3,919,867.

Rendessy, Willi: ı L. Dual purpose trailer sway control device and safety connector for mounting on either the towed or towing vehicle. 3,920,266, Cl. 280-446.00B.

Rendleman Thomas G. Milling machine tool tray. 3,919,949, Cl. 108-27.000.

Rengo Co., Ltd.: *See—*
Tokuno, Masateru, 3,920,502.

Republic Steel Corporation: *See—*
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Research Corporation: *See—*
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Vanderklaauw, Peter M., 3,920,780.

Retmeca S.A.: *See—*
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Reusser, Robert E.; and Meyer, Lawrence O., to Phillips Petroleum Company. Odor inhibition for paraffin hydrocarbons. 3,920,415, Cl. 44-75.000.

Reuting, Hans-Werner; Wahnschaffe, Klaus-Dieter; and Eggers, Hugo, to ELMEG Elektro-Mechanik GmbH. Electro-magnetic relay. 3,921,107, Cl. 335-78.000.

Rhee, Dong Woo, to GTE Sylvania Incorporated. Peak detector and sample and hold circuit. 3,920,891, Cl. 178-7.30R.

Rhee, Seong K., to Bendix Corporation, The. Conductive glass seal assembly. 3,920,172, Cl. 228-124.000.

Rhein-Chemie GmbH: *See—*
Butula, Ivan, 3,920,678.

Rheinstahl AG: *See—*
Kademann, Siegfried, 3,919,948.

Rhone-Poulenc: *See—*
Chabardes, Pierre; and Querou, Yvon, 3,920,751.

Ribaldone, Giuseppe; and Borsotti, Giampiero, to Montecatini Edison S.p.A. N-Ethyl-N-(2-butene-4-chloro)-amino-benzenes and processes for producing same. 3,920,741, Cl. 260-577.000.

Rice, Charles H., to Consolidation Coal Company. Process for making liquid and gaseous fuels from caking coals. 3,920,418, Cl. 48-210.000.

Rice, Verner K.: *See—*
Wilber, John A.; Buhrke, Rolfe E.; and Rice, Verner K., 3,921,141.

Richards, John Alan: *See—*
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Richards, Lawrence I., to Autoquip Corporation. Safety toe guard. 3,920,101, Cl. 187-98.000.

Richardson, Edwin A.; and Scheuerman, Ronald F., to Shell Oil Company. Self-neutralizing well acidizing. 3,920,566, Cl. 252-8.55C.

Riedel, Ekkehard; Schmid, Lothar; and Giebler, Fritz, to Siemens Aktiengesellschaft. Method and apparatus for the testing of single current-double current converter circuits and associated trunk lines in centrally controlled data switching installations. 3,920,899, Cl. 178-69.00G.

Riegel, Herbert; Schindler, Harvey D.; Sze, Morgan C.; and Brooks, Maurice E., to Lummus Company, The. Dehydrogenation process. 3,920,764, Cl. 260-683.00R.

Riessberger, Klaus: *See—*
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Rieter Machine Works Ltd.: *See—*
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Rikagaku Kenkyusho: *See—*
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Riker Laboratories, Inc.: *See—*
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Riley, Bernard James, Jr., to Xerox Corporation. Cleaning apparatus. 3,919,737, Cl. 15-308.000.

Rinaldi, Anthony J.: *See—*
Austin, Walter H., Jr.; Busuttil, John J.; and Rinaldi, Anthony J., 3,919,799.

Ringstad, Ralph H.; and Daley, James M., to Automatic Switch Company. Electrical power monitor. 3,921,070, Cl. 324-142.000.

Rippingille, Edward V., Jr.: *See—*
Kwok, Clyde C. K., 3,920,185.

RMI Company: *See—*
Bomberger, Howard B., Jr., 3,919,761.

Robert Bosch GmbH: *See—*
Eckert, Konrad, 3,919,992.
Haubner, Georg; Wesemeyer, Jurgen; and Meier, Werner, 3,919,987.
Wahl, Josef; Schmidt, Peter Jurgen; and Zechnall, Richard, 3,919,983.

Roberts, John S., to Westinghouse Electric Corporation. Method of forming reflective means in a light activated semiconductor controlled rectifier. 3,920,495, Cl. 156-8.000.

Roberts, Lincoln Edwin; and Shoemaker, John Robert, to AMP Inc. Electrical connectors for flat cable and methods of making same. 3,920,301, Cl. 339-17.00F.

Robertson, Forrest F.: *See—*
Williams, Donald E.; and Robertson, Forrest F., 3,919,951.

Robertson, Jerry E.: *See—*
Harrington, Joseph Kenneth; Kvam, Donald C.; Mendel, Arthur; and Robertson, Jerry E., 3,920,444.
Harrington, Joseph Kenneth; Kvam, Donald C.; Mendel, Arthur; and Robertson, Jerry E., 3,920,690.

Robinson, Arthur R.; Pecknold, David A. W.; and Walker, William Hamilton, to Sangamo Electric Company. Seismic resistant structure for a capacitor bank. 3,921,039, Cl. 317-103.000.

Roby Industries, Inc.: *See—*
Sauriol, John T.; and Gross, Walter H., 3,920,347.

Rocco, Frank Louis: *See—*
Marmo, Don; and Rocco, Frank Louis, 3,920,849.

Rochling, Hans; Horlein, Gerhard; and Hartel, Kurt, to Hoechst Aktiengesellschaft. Benzimidazole carbamates. 3,920,684, Cl. 260-309.200.

Rockwell International Corporation: *See—*
Bass, Larry F., 3,920,975.

Hamilton, Charles Howard; and Ascani, Leonard A., Jr., 3,920,175.
Jones, Freeman B., Jr.; Chang, Roger; and Parry, Edward P., 3,920,576.
Tu, Peter K. C.; Brooke, Alan H.; and Miller, Frank S., 3,920,426.

Roder, Kurt; Puttner, Reinhold; and Pieroh, Ernst-A., to Schering AG. Benzimidazole-1-carboxylic acid amides. 3,920,682, Cl. 260-309.200.

Roders, George W., to Modine Manufacturing Company. Apparatus and method for applying strip solder material. 3,919,760, Cl. 29-417.000.

Roe, Glenn D., to Atlantic Richfield Company. Automatic sample changer for positioning a plurality of pellets in an X-ray analyzer. 3,920,151, Cl. 221-232.000.

Roeder, Robert S.: *See*—
Lazarchik, Robert E.; Roeder, Robert S.; and Runkle, Donald R., 3,921,169.

Rogers, Orris A.; Camp, Eldridge K.; and Borgmann, John P., to American Chemical & Refining Company, Inc. Method for high speed continuous electroplating using platinum clad anode assembly. 3,920,524, Cl. 204-28.000.

Rohm GmbH: *See*—
Gaenzler, Wolfgang; Kabs, Klaus; and Schroeder, Guenter, 3,920,736.

Rohr, Wolfgang; Franke, Albrecht; Giertz, Hubert; and Amann, August, to Badische Anilin- & Soda-Fabrik Aktiengesellschaft. Inflammation inhibiting bis-carbamate composition. 3,920,829, Cl. 424-300.000.

Roinestad, Gerald C., to Ashworth Bros., Inc. Wire conveyor belt. 3,920,117, Cl. 198-194.000.

Rojey, Alexandre, to Institut Francais du Petrole, des Carburants et Lubrifiants. Process and apparatus for cooling and/or liquefying a gas or a gas mixture. 3,919,853, Cl. 62-9.000.

Rolin, Kenneth: *See*—
Redmer, Wilbert; Rolin, Kenneth; and Nittel, Herman, 3,920,374.

Rona, Peter, to IMI (TAMI) Institute for Research & Developement. Solid catalyst for heterogeneous reactions. 3,920,582, Cl. 252-430.000.

Rooney, Clarence Stanley: *See*—
Wasson, Burton Kendall; and Rooney, Clarence Stanley, 3,920,691.

Roope, Jesse William Thomas: *See*—
Ash, Arthur Edward Michael; and Roope, Jesse William Thomas, 3,920,003.

Roosen, Manfred: *See*—
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Roper, Brian Arnold: *See*—
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Roper Corporation: *See*—
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Rosa, John: *See*—
Kernick, Andress; Rosa, John; and Bowles, David L., 3,921,038.

Roseman, Theodore J., to Upjohn Company, The. Pharmaceutical devices and method. 3,920,805, Cl. 424-15.000.

Ross, Cecil J. Inclined portable exercise frame. 3,920,240, Cl. 272-57.00R.

Ross, Charles R., to Ross, Robertson. Boat propeller mounting and steering mechanism. 3,919,965, Cl. 115-35.000.

Ross, J. Richard, deceased (by Ross, Maza C., administrator), to United States of America, Interior. Method of desorbing gold from activated carbon. 3,920,403, Cl. 204-110.000.

Ross, Maza C., administrator: *See*—
Ross, J. Richard, deceased, 3,920,403.

Ross, Robert R., to H. A. Phillips & Co. Refrigerating system. 3,919,859, Cl. 62-503.000.

Ross, Robertson: *See*—
Ross, Charles R., 3,919,965.

Ross, Samuel Scott. Polymeric steam scrubber to control particulates. 3,920,423, Cl. 55-103.000.

Rotastikova, Nina Alexandrovna: *See*—
Golyshin, Nikolai Mikhailovich; Andreeva, Elena Ivanovna; Dvoichenkova, Elza Alexandrovna; Ukrainets, Nina Sergeevna; Skazkina, Tatyana Pavlovna; Solovieva, Galina Viktorovna; Bodrova, Margarita Romanovna; Rotastikova, Nina Alexandrovna; Melnikov, Nikolai Nikolaevich; Kukalenko, Stepan Sofronovich; Nuridzhanian, Karen Armenakovich; Nesterova, Lilia Mikhailovna; Usmanov, Marat Tashpulatovich; Novikova, Raisa Grigorievna; Kuznetsova, Galina Vladimirovna; Volodkovich, Stepan Dmitrievich; Burmakin, Nikolai Mikhailovich; Obukhova, Valentina Ivanovna; Monova, Violetta Ivanovna; Shkuratova, Galina Nikonovna; Sanin, Mikhail Arsenievich; Kulagina, Natalya Nikolaevna; and Mironova, Nina Evgenievna, 3,920,680.

Roth, Philip B., to American Cyanamid Company. Textile finish using a combination of an aminoplast resin and monomethyloldicyandiamide. 3,920,881, Cl. 428-526.000.

Roth, Robert I.: *See*—
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Rotman, Avner: *See*—
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Roussel UCLAF: *See*—
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Perronnet, Jacques; and Girault, Pierre, 3,920,842.

Routh, Claude C.: *See*—
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Rowas, Clifford A., to Schauer Manufacturing Corporation. Programmed battery charging system. 3,921,050, Cl. 320-19.000.

Rowland, Incorporated: *See*—
Randall, Robert E., 3,920,366.

Roy Lapidus, Inc.: *See*—
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Roy, Marie-Annick, to Compagnie Industrielle des Telecommuncations Cit-Alcatel. Modulator with numerical operation for voice-frequency telegraphy and similar signals. 3,920,917, Cl. 179-15.00A.

Roy, Waldemar: *See*—
Laufer, Siegmar; and Roy, Waldemar, 3,920,865.

Roza, Engel, to U.S. Philips Corporation. Coaxial cable including line repeaters for broadband signals. 3,920,932, Cl. 179-170.00R.

RTE Corporation: *See*—
Burns, Clarence B., 3,920,307.
Mikulecky, Harvey W., 3,921,116.

Rucha, Ulrich: *See*—
Sandmann, Herbert; Dietze, Wolfgang; Rucha, Ulrich; and Barowski, Gerhard, 3,919,968.

Rudinger, Josef: *See*—
Dawson, Daniel J.; and Rudinger, Josef, 3,920,855.

Rudman, Ronald H., to United States of America, Army. Electronic firing device for soft recoil weapons. 3,919,918, Cl. 89-42.00B.

Ruemens, Wilhelm: *See*—
Petersen, Harro; Erhardt, Klaus; Ruemens, Wilhelm; and Bille, Heinz, 3,920,390.

Rufenacht, Kurt, to Ciba-Geigy Corporation. Certain phosphorus acid esters. 3,920,671, Cl. 260-302.00E.

Rufer, Clemens; Schroder, Eberhard; and Kessler, Hans-Joachim, to Schering Aktiengesellschaft. Nitroimidazolyl benzoquinazolines. 3,920,655, Cl. 260-256.40Q.

Ruhe, Robert W., Jr.: *See*—
McQueen, Robert W.; and Ruhe, Robert W., Jr., 3,920,090.

Ruhrchemie Aktiengesellschaft: *See*—
Feichtinger, Hans; Noeske, Heinz; and Birnkraut, Hans-Walter, 3,920,713.

Runkle, Donald R.: *See*—
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Russell, Lewis K., to Signetics Corporation. Method for forming a semiconductor structure having islands isolated by adjacent moats. 3,920,482, Cl. 148-1.500.

Russell, Wayne B., Jr. Extendable and retractible material delivery devices. 3,920,084, Cl. 173-79.000.

Rust, Robert H. Electronic bass instrument. 3,919,910, Cl. 84-1.150.

Ryan, Donald James: *See*—
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Ryan, Francis D.: *See*—
Keeter, Raleigh F.; Ryan, Francis D.; Wellner, Kenneth V.; and Nickstadt, Gerhard A., 3,919,894.

Ryan, William Anthony: *See*—
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Ryan, William P.: *See*—
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S.A.E.S. Getters S.p.A.: *See*—
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S.B. Electronic Systems Limited: *See*—
Sims, George Edward, 3,920,957.

Saab Scania Aktiebolag: *See*—
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Sackett, Philip B., to United States of America, Air Force. System for intensification of weak absorption and collection of weak light emission. 3,920,336, Cl. 356-201.000.

Sagawa, Seiji; Itoi, Hiroyasu; Fujiyoshi, Kazuhiko; and Kagaya, Kazuyoshi, to Sumitomo Chemical Company, Ltd. Isopropanolamine esters of 3-[3,5 di-t-butyl-4-hydroxyphenyl]propanoic acid. 3,920,729, Cl. 260-473.00S.

Sahir, Ahamado Ismail: *See*—
Curry, Kenneth Vasey; and Sahir, Ahamado Ismail, 3,920,807.

Saito, Shiro, to Nikka Kabushiki Kaisha. Powder sprayer. 3,920,153, Cl. 222-14.000.

Sajben, Johannes-Otto: *See*—
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Sakabe, Akira: *See*—
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Sakagami, Mitsuhiro: *See*—
Takahashi, Chiyomaru; Kaneko, Tadao; Sakabe, Akira; Sakagami, Mitsuhiro; and Arai, Kunio, 3,920,946.

Sakai, Satoshi; Shimizu, Norio; and Nomura, Junji, to Matsushita Electric Works, Ltd. Outer cutting blade for electric dry shaver. 3,919,770, Cl. 30-43.600.

Sakamaki, Hisashi: *See*—
Komori, Shigehiro; Sakamaki, Hisashi; Hattori, Hiroyuki; Iida, Toshihide; Miyamoto, Koichi; and Umezawa, Kazumi, 3,919,972.

Salata, Dario, to Retmeca S.A. Method and machine for manufacturing shaped parts from flat sheet metal. 3,920,173, Cl. 228-147.000.

Samelson, Harold: *See*—
Schlafer, John D.; Lempicki, Alexander; Samelson, Harold; and Fowler, Vernon John, 3,920,983.

Samour, Carlos M., to Kendall Company, The. Diphenylhydantoin compounds. 3,920,686, Cl. 260-309.500.

Samson Apparatebau A.G.: *See*—
Gruner, Karl, 3,920,044.

Sanders Associates, Inc.: *See*—
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Schmitt, Joseph W.; and Starkey, Donald L., 3,920,978.

Sanders, Darryl W.: *See*—
Moran, Robert F.; and Sanders, Darryl W., 3,920,093.

Sanders, David H.; Lynch, Henry W.; and Uy, Sennen, to Medical Engineering Corporation. Implantable prosthesis having a self-sealing valve. 3,919,724, Cl. 3-36.000.

Sanders, Peter K. Scavenger filter. 3,920,554, Cl. 210-247.000.

Sanderson, Neville Edward; and Youngs, Bertram Benjamin, to British Domestic Appliances Limited. Burner units for gas appliances. 3,920,375, Cl. 431-78.000.

Sandfort, Robert M.: *See*—
Minnick, Robert C.; Bailey, Paul T.; and Sandfort, Robert M., 3,921,155.

Sandfort, Robert Melvin, to Monsanto Company. Nonuniform spacing layer for magnetic bubble circuits. 3,921,157, Cl. 340-174.0TF.

Sandmann, Herbert; Dietze, Wolfgang; Rucha, Ulrich; and Barowski, Gerhard, to Siemens Aktiengesellschaft. Reaction device for pyrolytic deposition of semiconductor material. 3,919,968, Cl. 118-5.000.

Sandoz, Inc.: *See*—
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Houlihan, William J., 3,920,646.

Sandoz Ltd.: *See*—
Schelling, Hans-Peter; and Schaub, Fritz, 3,920,711.

Sangamo Electric Company: *See*—
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Sanin, Mikhail Arsenievich: *See*—
Golyshin, Nikolai Mikhailovich; Andreeva, Elena Ivanovna; Dvoichenkova, Elza Alexandrovna; Ukrainets, Nina Sergeevna; Skazkina, Tatyana Pavlovna; Solovieva, Galina Viktorovna; Bodrova, Margarita Romanovna; Rotastikova, Nina Alexandrovna; Melnikov, Nikolai Nikolaevich; Kukalenko, Stepan Sofronovich; Nuridzhanian, Karen Armenakovich; Nesterova, Lilia Mikhailovna; Usmanov, Marat Tashpulatovich; Novikova, Raisa Grigorievna; Kuznetsova, Galina Vladimirovna; Volodkovich, Stepan Dmitrievich; Burmakin, Nikolai Mikhailovich; Obukhova, Valentina Ivanovna; Monova, Violetta Ivanovna; Shkuratova, Galina Nikonovna; Sanin, Mikhail Arsenievich; Kulagina, Natalya Nikolaevna; and Mironova, Nina Evgenievna, 3,920,680.

Sankyo Company Limited: *See*—
Kitano, Noritoshi; Sugawara, Shinichi; Kishida, Yukichi; Kondo, Fusao; Sugimura, Yukio; and Soma, Nobuo, 3,920,843.

Santos, Astrogildo, Sr. Simulated soccer game apparatus. 3,920,243, Cl. 273-85.00F.

Sanyo Electric Company, Ltd.: *See*—
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Sapon, Anatoly Dmitrievich: *See*—
Arifov, Ubai Arifovich; Kharmats, Dmitry Efimovich; Abdurashidov, Gafur Abdushukurovich; Leontiev, Gennady Andreevich; Zhegallo, Jury Vladimirovich; Parilis, Eduard Simkhovich; Vzenkonsky, Alexandr Vasilievich; Sapon, Anatoly Dmitrievich; Lavnikanis, Vladimir Fedorovich; Kogan, Mark Iosifovich; Egorov, Nikolai Petrovich; and Shaidullin, Abuzar Gabdurakhmanovich, 3,919,742.

Sarbacher, Robert I.; and Mauch, Robert E., to Bogue, John C. Ballast for light system. 3,921,033, Cl. 315-141.000.

Sarem, Amir M., to Union Oil Company of California. Method for improving the injectivity of water injection wells. 3,920,074, Cl. 166-274.000.

Sarre, Olga: *See*—
Ganguly, Ashit K.; Sarre, Olga; and Szmulewicz, Sol, 3,920,629.

Saruwatari, Shigeto, to Matsushita Electric Industrial Co., Ltd. Channel indicator. 3,919,966, Cl. 116-124.10A.

Sasaki, Kantaro; and Oda, Mitsuo, to Sumitomo Metal Industries, Ltd.; and Aikoh Co., Ltd. Top pouring ingot making method using cover flux. 3,920,063, Cl. 164-55.000.

Sasaki, Michio; and Kikui, Keizo, to Mitsui Shipbuilding & Engineering Co. Ltd. Pushed suction dredger and barge combination. 3,919,790, Cl. 37-66.000.

Sasaki, Youichi; and Tashima, Junichiro, to Tokyo Shibaura Electric Co., Ltd. Nuclear reactor fuel assembly. 3,920,517, Cl. 176-78.000.

Sasse, Klaus: *See*—
Widdig, Arno; Kuhle, Engelbert; Sasse, Klaus; Scheinpflug, Hans; Grewe, Ferdinand; Kaspers, Helmut; and Frohberger, Paul-Ernst, 3,920,831.

Sato, Hiroshi; Takahashi, Koji; Shigeta, Sadaaki; and Abe, Yoshitaka, to Mitsubishi Rayon Co., Ltd. Metal-containing organic high molecular compound reinforced with particulate organic or inorganic material. 3,920,605, Cl. 260-42.170.

Sato, Naonobu: *See*—
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Sato, Shunichi; Kurata, Masaharu; Tanigaichi, Mineaki; Iguchi, Fumiki; and Iwasawa, Kazuyoshi, to Mitsubishi Gas Chemical Company, Inc. Resin composition for laminates. 3,920,594, Cl. 260-19.00R.

Sato, Yasuhito: *See*—
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Sato, Yoichi, to Nippon Electric Company, Ltd. Self-adaptive equalizer for multilevel data transmission according to correlation encoding. 3,921,072, Cl. 325-42.000.

Sato, Yoshio: *See*—
Hanauye, Kunio; Iwasa, Mitsuhiro; Takase, Tsutomu; Ito, Mizuo; Sato, Yoshio; Toyama, Teruhiko; Morikawa, Osamu; and Imai, Takamitsu, 3,920,846.

Saunders, John P.; and Leach, Burleigh H., to GTE Sylvania Incorporated. Method of making photoflash lamp ignition mount structure with shaped bead. 3,919,750, Cl. 29-25.150.

Sauriol, John T.; and Gross, Walter H., to Roby Industries, Inc. Manhole cover. 3,920,347, Cl. 404-25.000.

Savas, Gunnar: *See*—
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Sawa, Yoshio: *See*—
Shimada, Fumitake; Ikekawa, Tetsuro; Tachibana, Kooichi; Endo, Tomio; Kohno, Tetsuo; Kuroda, Hideo; Ikeda, Yoshiaki; Okazaki, Yoshimi; and Sawa, Yoshio, 3,920,665.

Sawazaki, Masatoshi, to Precision Fukuhara Works, Ltd. Electronic needle selecting means for circular knitting machines. 3,919,863, Cl. 66-50.00R.

Sawyer, Willard H.: *See*—
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Saxenmeyer, George J., Jr.: *See*—
Caricchio, Jerome J., Jr.; Saxenmeyer, George J., Jr.; and York, Edward R., 3,920,526.

Sbragia, Ronald J.: *See*—
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SCAL - Societe de Conditionnements en Aluminum: *See*—
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Scarpa, Eric W.; and Weichhand, Robert J., to R. A. Jones & Co. Inc. Drop loader. 3,920,134, Cl. 214-43.000.

Schaar, Charles H., to Colgate-Palmolive Company. Disposable diaper with elastic means. 3,920,018, Cl. 128-287.000.

Schaar, Charles H., to Colgate-Palmolive Company. Disposable diaper with cover means. 3,920,019, Cl. 128-287.000.

Schaefer, Dora B., to Puppy Palace Enterprises, Inc. Direct kennel exhaust system. 3,919,978, Cl. 119-19.000.

Schaeffer, Norman E. Trash cutting means for plows. 3,920,078, Cl. 172-39.000.

Schaible, Clifford Warren, to Bell Telephone Laboratories, Incorporated. Phase-locked frequency synthesizer with means for restoring stability. 3,921,094, Cl. 331-1.00A.

Schatz, Douglas S., to Applied Materials, Inc. Resonant load power supply with phase locked loop. 3,921,092, Cl. 331-1.00R.

Schaub, Fritz: *See*—
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Schauer Manufacturing Corporation: *See*—
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Scheibe, Peter; Bernt, Erich; and Gruber, Wolfgang, to Boehringer Mannheim GmbH. Uric acid standard solution. 3,920,400, Cl. 23-230.00B.

Scheiber, Robert: *See*—
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Scheinpflug, Hans: *See*—
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Schellenberg, Hans: *See*—
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Schelling, Hans-Peter; and Schaub, Fritz, to Sandoz Ltd. Unsaturated ethers and thioethers. 3,920,711, Cl. 260-399.000.

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Scherrer, Robert A., to Riker Laboratories, Inc. Substituted benzofurans. 3,920,828, Cl. 424-285.000.

Scheuerman, Ronald F.: *See*—
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Scheuermann, Horst: *See*—
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Scheuneman, James H., to Sperry Rand Corporation. Three-rank priority select register system for fail-safe priority determination. 3,921,150, Cl. 340-172.500.

Schibler, Luzius; and Merz, Jurg, to Ciba-Geigy AG. Carbamide-formaldehyde condensation products. 3,920,645, Cl. 260-249.500.

Schiedrum, Hans-Otto: *See*—
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Schiemann, Heinz, to Siemens Aktiengesellschaft. Single-conductor transformer for high-voltage installations. 3,921,113, Cl. 336-84.000.

Schindler, Harvey D.: *See—*
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Schindler, Herbert; and Ware, Willard O., to M.M.S. Limited. Heat exchanger for continuous flow fluid heater. 3,920,067, Cl. 165-38.000.

Schirneker, Hans-Ludwig. Hand firearms and ammunition therefor. 3,919,921, Cl. 89-132.000.

Schlafer, John D.; Lempicki, Alexander; Samelson, Harold; and Fowler, Vernon John, to GTE Laboratories Incorporated. Multi-channel optical communications system utilizing multi wavelength dye laser. 3,920,983, Cl. 250-199.000.

Schlage, Ernest L., to Schlage Lock Company. Machine for making obtunded key profile. 3,919,920, Cl. 90-13.050.

Schlage Lock Company: *See—*
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Schlichte, Max, to Siemens Aktiengesellschaft. Circuit arrangement for mutual synchronization of the clock oscillators provided in the central offices of a PCM time-division multiplex telecommunication network. 3,920,915, Cl. 179-15.0BS.

Schloemann-Siemag AG: *See—*
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Groos, Horst Hans, 3,919,878.

Schloetterer, Heinrich, to Siemens Aktiengesellschaft. Method for the production of integrated circuits with complementary channel field effect transistors. 3,919,765, Cl. 29-571.000.

Schloetterer, Heinrich, to Siemens Aktiengesellschaft. Method for the production of integrated circuits with field effect transistors of variable line condition. 3,919,766, Cl. 29-571.000.

Schlunke, Jurgen: *See—*
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Schmall, Karl-Heinz, to Precitec Gesellschaft fur Prazisionstechnik und Elektronik. Push-on handle. 3,919,738, Cl. 16-110.00R.

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Schmid, Lothar: *See—*
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Schmidt, Donald J., to United States of America, Air Force. Method and system for computing altitude over a target and the horizontal range thereof. 3,921,170, Cl. 343-12.00A.

Schmidt-Dunker, Manfred; Ploger, Walter; Worms, Karl-Heinz; Blum, Helmut; and Gloxhuber, Christian, to Henkel & Cie GmbH. Method of treatment of calcium disorders using cyclohexane-hexacarboxylic acid. 3,920,837, Cl. 424-317.000.

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Schmitt, Joseph W.; and Starkey, Donald L., to Sanders Associates, Inc. Spectrum analyzer. 3,920,978, Cl. 235-156.000.

Schnyder, Conrad Wolfgang: *See—*
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Schoerner, Roger J.; and Chia, Enrique C., to Southwire Company. Aluminum alloy electrical conductor and method for making same. 3,920,411, Cl. 29-193.000.

Schofer, Hans: *See—*
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Schokkenbroek, Jan, to Hoogovens Ijmuiden BV. Method for repairing ingot stools. 3,920,948, Cl. 219-76.000.

Scholkens, Bernward: *See—*
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Scholl, Gerrit Jan: *See—*
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Scholtze, Herman J. Keyless chain lock. 3,920,273, Cl. 292-264.000.

Schon, Nikolaus: *See—*
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Schonemeyer, Hilmar, to International Standard Electric Corporation. Path finding and marking circuit. 3,920,923, Cl. 179-18.0GF.

Schorr, Manfred; Worm, Manfred; and Schrinner, Elmar, to Hoechst Aktiengesellschaft. Acylamino-cephem-carboxylic acids and process for preparing them. 3,920,640, Cl. 260-243.00C.

Schreiber, Gunter: *See—*
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Schreiber, William L.; and Pittet, Alan O., to International Flavors & Fragrances Inc. Process for producing alkenals and intermediates therefor. 3,920,755, Cl. 260-615.00A.

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Schroder, Eberhard: *See—*
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Schroder, Heinz: *See—*
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Schroder, Ludwig; Thomas, Klaus; and Goeth, Hanns, to Boehringer Ingelheim GmbH. Pharmaceutical compositions containing a (5-nitro-2-furyl)-substituted 2-hydroxy-pyridine and method of use. 3,920,821, Cl. 424-263.000.

Schroeder, David L.; Pearce, Jai K.; and Schempp, Eberhard G., to Pennsylvania Engineering Corporation. Steel production method. 3,920,447, Cl. 75-60.000.

Schroeder, Guenter: *See—*
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Schroeder, James W.; and Naso, Anthony C., to Republic Steel Corporation. Method of removing ammonia from ammonia containing liquor. 3,920,419, Cl. 55-70.000.

Schroeder, Walter. Pressurized lubricating system for a reciprocating compressor drive. 3,920,098, Cl. 184-5.000.

Schubert, Egon: *See—*
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Schuler, Wilhelm Alfons: *See—*
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Schultz Manufacturing Company Limited, The: *See—*
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Schultz, Robert F.; and Cook, Edward H., Jr., to Hooker Chemicals & Plastics Corporation. Bipolar electrode. 3,920,535, Cl. 204-290.00F.

Schultz, Robert S. Automatic tip-seal valve. 3,920,165, Cl. 222-402.230.

Schuster, Erich: *See—*
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Schuy, Klaus Dieter. Method and device for determination of gases dissolved in a liquid especially in blood. 3,920,396, Cl. 23-230.00B.

Schwan, Thomas J., to Morton-Norwich Products, Inc. 6,6A,7,11B-Tetrahydro-5H-indeno(2,1-C)isoquinoline hydrochloride. 3,920,666, Cl. 260-286.00R.

Schwan, Wolfgang: *See—*
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Scott, Eldred D., to Precision Sales Corporation. Press with adjustable stroke. 3,919,909, Cl. 83-530.000.

Scott, Gerald; and Humphris, Kenneth John, to J. A. Kemp & Co. Stabilized polymer compositions. 3,920,607, Cl. 260-45.80R.

Scott, William J., to Ideal Industries, Inc. No-strip tap connector. 3,920,305, Cl. 339-98.000.

Seale, Virgil L.: *See—*
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Seehase, Jack C. Optical collimation gage. 3,920,335, Cl. 356-138.000.

Segal, Leon; and Oswald, Hendrikus J., to Allied Chemical Corporation. Glass fiber filled polyamide composites. 3,920,879, Cl. 428-474.000.

Seitzer, Walter H.; and Shinn, Robert W., to Sun Research and Development Co. Coal dissolving process. 3,920,536, Cl. 208-10.000.

Seitzer, Walter H., to Sun Ventures, Inc. Hydrogen process. 3,920,804, Cl. 423-650.000.

Self Development Inc.: *See—*
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Selmeczi, Joseph G.; Marlin, Donald H.; and Kestner, Daniel W., to Dravo Corporation. Stabilization of sludge slurries. 3,920,795, Cl. 423-242.000.

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Seyd, Gunter; Bergbauer, Axel; and Paulsen, Uwe, to Siemens Aktiengesellschaft. Method and apparatus for testing closed-end tubes in heat exchangers of nuclear reactors and the like. 3,919,880, Cl. 73-49.800.

Seymour, Shaun A.: *See—*
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Shanafelt, Robert E.; Hilton, Richard F.; and Archer, Donald H., to Raytheon Company. Constant beamwidth antenna. 3,921,176, Cl. 343-754.000.

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Shattuck, Richard E.; and Cryder, Albert H., to SCM Corporation. Release and blocking mechanism for power operated typewriters. 3,920,114, Cl. 197-107.000.

Shaub, Harold; and Garbus, Adolph J., to Exxon Research & Engineering Co. Synthetic ester lubricant compositions with improved ryder gear load-carrying ability. 3,920,568, Cl. 252-34.700.

Shaw, George M. Vehicle steerable wheel stabilizer. 3,920,262, Cl. 280-94.000.

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Shelton, Joe; Hagood, Jerry W.; and Norman, Ralph L. Microwave beam tube. 3,921,027, Cl. 315-5.390.

Shenoy, Vittal U., to Xerox Corporation. Electrostatic reproduction machine with improved corona generating device. 3,921,042, Cl. 317-262.00A.

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Sheridan, Richard C., to Tennessee Valley Authority. Method of preparing purified phosphates from impure phosphoric acid. 3,920,796, Cl. 423-313.000.

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Shiba, Keisuke; and Hinata, Masanao, to Fuji Photo Film Co., Ltd. Photographic sensitive material suitable for the silver-dyestuff bleaching method. 3,920,458, Cl. 96-99.000.

Shields, Walter A. Receptacle unstacking and transporting device. 3,920,152, Cl. 221-236.000.

Shiga, Masaaki: *See—*
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Shigeta, Sadaaki: *See—*
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Shiki, Takehiko; Harada, Ikuo; Harada, Tadamasa; and Shiga, Masaaki, to Asahi Kasei Kogyo Kabushiki Kaisha. Gas generating composition and method of preparing compression molded articles therefrom. 3,920,575, Cl. 252-188.300.

Shimada, Fumitake; Ikekawa, Tetsuro; Tachibana, Kooichi; Endo, Tomio; Kohno, Tetsuo; Kuroda, Hideo; Ikeda, Yoshiaki; Okazaki, Yoshimi; and Sawa, Yoshio, to Kanebo, Ltd.; and Ikekawa, Tetsuro. Berbine compounds. 3,920,665, Cl. 260-286.00Q.

Shimamura, Toshio: *See—*
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Shimazaki, Fujio. Calendar provided with seals. 3,919,796, Cl. 40-110.000.

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Shirley, Dorrel Roosevelt; and Stiles, Gilbert Johnson, Sr., to Bell Telephone Laboratories, Incorporated. Pseudo-random parallel word generator. 3,920,894, Cl. 178-22.000.

Shiroki, Masami: *See—*
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Shoh, Andrew; and Holze, Ernest P., Jr., to Branson Ultrasonics Corporation. Friction welding apparatus. 3,920,504, Cl. 156-580.000.

Showa Manufacturing Co., Ltd.: *See—*
Kuwano, Nobuyori; and Tsuchiya, Takayoshi, 3,920,091.

Shrader, David L. Method and apparatus for improving musical ability. 3,919,913, Cl. 84-454.000.

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Shveda, Andrew P., to Owens-Illinois, Inc. Combination package. 3,920,120, Cl. 206-217.000.

Siddoway, Richard D. Load carrying device. 3,920,255, Cl. 280-5.260.

Sie, Swan T.: *See—*
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Sills, Richard E.; and Allison, Gary L., to Xytex Corporation. Automatic tape reel mount. 3,920,195, Cl. 242-180.000.

Simes S.p.A.: *See—*
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Simmons, Donald F. Door structure. 3,919,808, Cl. 49-367.000.

Simms, Robert A. Process for changing the tint of a photochromic material and material formed thereby. 3,920,463, Cl. 106-54.000.

Simon-Carves Limited: *See—*
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Simon, Lionel N.: *See—*
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Simon, Michael; and Geyer, Werner, to Maschinenfabrik Augsburg-Nurnberg AG. Track unit for high-performance rapid-transit trains. 3,919,947, Cl. 104-124.000.

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Jacobs, Richard L.; Backley, Donald A.; Simpson, James V.; and Beck, Walter, 3,920,590.
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Sims, Ronald Ian, to Joseph Lucas (Batteries) Limited. Battery plate grids for lead-acid batteries. 3,920,473, Cl. 136-65.000.

Singer Company, The: *See—*
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Sircar, Jagadish C.; and Zinnes, Harold, to Warner-Lambert Company. 4-Hydroxy-9-methyl-4-vinyl-1,2,3,4-tetrahydrocarbazole. 3,920,694, Cl. 260-315.000.

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Slater, William L., to Texaco Inc. Synthesis gas production by partial oxidation. 3,920,579, Cl. 252-373.000.

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Small, Hamish; and Bauman, William C., to Dow Chemical Company, The. Apparatus and method for quantitative analysis of ionic species by liquid column chromatography. 3,920,397, Cl. 23-230.00R.

Small, Hamish; and Stevens, Timothy S., to Dow Chemical Company, The. Method for chromatographic analysis of organic acids or their carboxylate salts. 3,920,398, Cl. 23-230.00R.

Smedley, Michael John: *See—*
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Smith, Carl Mayn; and Tiers, George Van Dyke, to Minnesota Mining and Manufacturing Company. Silicone-compatible indigo dyestuffs. 3,920,695, Cl. 260-322.000.

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Smith, Drexel Kermit: *See—*
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Smith, Edward A.; and Day, Robert L. Method for assembling a preformed floor and roof structure. 3,919,825, Cl. 52-741.000.

Smith, George Elwood; and Strain, Robert Joseph, to Bell Telephone Laboratories, Incorporated. Two and four phase charge coupled devices. 3,921,195, Cl. 357-24.000.

Smith, Harry; Buckle, Derek Richard; Spicer, Barbara Anne; and Wade, Esther Beatrice, to Beecham Group Limited. 2-Nitroindan-1,3-dione. 3,920,845, Cl. 424-331.000.

Smith, Harry: *See—*
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Smith Kline & French Laboratories Limited: *See—*
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Smith, Leward N. Dredger having separately floating dredge and tail sections and method of dredging. 3,919,791, Cl. 37-67.000.

Smith, Norman Wilson: *See—*
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Smith, Peter William, to Bell Telephone Laboratories, Incorporated. Method of fabricating an optical fiber ribbon. 3,920,432, Cl. 65-4.000.

Smith, Warren B.; Whitmer, Harold L.; and Whitmer, Hazel G., to Whitmer, Harold L.; and Whitmer, Hazel G. Microwave fluid heater. 3,920,945, Cl. 219-10.55R.

Smithkline Corporation: *See—*
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Sobczyk, John James. Field effect recordings and semiconductor playback devices. 3,920,930, Cl. 179-100.41T.

Societe d'Assistance Technique Pour Produits Nestle S.A.: *See—*
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Song, Won R.; and Jacobson, Norman, to Exxon Research & Engineering Co. Polymers comprising vinyl aromatic, $C_2$ to $C_8$ olefin are useful as lubricant additives. 3,920,622, Cl. 260-80.780.

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Sparrow, Rodney G., to Peerless Pressed Metal Corporation. Demountable swing seat construction for counters and the like. 3,920,276, Cl. 297-142.000.

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Spitz, Peter H.; and Frank, Marshall E., to Chem Systems. Liquid phase methanol gasification. 3,920,716, Cl. 260-449.00M.
Spivack, John D.; and Luzzi, John J., to Ciba-Geigy Corporation. Metal salts of benzoyloxybenzoates and compositions stabilized therewith. 3,920,712, Cl. 260-429.00R.
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Springer, Robert H.; O'Brien, Darrell E.; and Simon, Lionel N., to ICN Pharmaceuticals, Inc. Aromatic substituted pyrazola [1,5a] pyrimidine compounds useful as xanthine oxidase inhibitors. 3,920,652, Cl. 260-256.40F.
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Stach, Leonard J., to Velsicol Chemical Corporation. Phosphoramidates and phosphonamidates. 3,920,772, Cl. 260-944.000.
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Stamicarbon, N.V.: *See*—
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Streck, Roland, to Weber, Heinrich; and Chemische Werke Huels Aktiengesellschaft. Process for the production of polymeric hydrocarbons with reactive silyl side groups. 3,920,714, Cl. 260-448.20E.
Streck, Roland; and Weber, Heinrich, to Chemische Werke Huels Aktiengesellschaft. Process for the production of polymeric hydrocarbons having reactive silyl end groups. 3,920,715, Cl. 260-448.20E.
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Suda, Hideaki; Kanda, Tatsuo; Tomita, Hiroshige; Nakanishi, Hirotoshi; Hida, Hiromu; and Nuno, Tatsumi, to Sumitomo Chemical Company, Limited. Process for the production of aromatic diamines. 3,920,739, Cl. 260-556.00A.

Suda, Masashi: *See—*
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Sudakas, Lev Girshovich: *See—*
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Sugawara, Katsuro: *See—*
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Sugawara, Kiyoshi, to Rank Xerox, Ltd. Toner level detector. 3,920,154, Cl. 222-23.000.

Sugawara, Shinichi: *See—*
Kitano, Noritoshi; Sugawara, Shinichi; Kishida, Yukichi; Kondo, Fusao; Sugimura, Yukio; and Soma, Nobuo, 3,920,843.

Suggitt, Robert M.; and Gates, Walter C., Jr., to Texaco Inc. Production of amines from sulfur bearing paraffins. 3,920,744, Cl. 260-583.00M.

Sugimoto, Hachiro: *See—*
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Sugimura, Takaaki: *See—*
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Sugimura, Yukio: *See—*
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Sugino Cycle Industries, Ltd.: *See—*
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Sugino, Yasushi, to Sugino Cycle Industries, Ltd. Adjustable bicycle crank assembly with preloaded bearings and cotterless cranks. 3,919,898, Cl. 74-594.200.

Sugita, Yoshimitsu; Kato, Teruo; Sugawara, Katsuro; and Tamura, Masao, to Hitachi, Ltd. Process for manufacturing a semiconductor device with a silicon monocrystalline body having a specific crystal plane. 3,920,492, Cl. 148-175.000.

Sullivan, A. Eugene. Full flow leaching pit. 3,919,848, Cl. 61-11.000.

Sulzer Brothers Ltd.: *See—*
Aguet, Emile, 3,919,839.

Sumida, Shizuo, to Toyo Kogyo Company, Limited. Malfunction preventive system for use in an air bag incorporating a sensor for detecting the collision speed of a vehicle. 3,921,129, Cl. 340-52.00H.

Sumitomo Chemical Company, Ltd.: *See—*
Nakashio, Seizo; Maruta, Isao; Hayatsu, Kazuo; and Kono, Yoichi, 3,920,770.
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Sun Oil Company of Pennsylvania: *See—*
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Sun Ventures, Inc.: *See—*
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Susbielles, Gilles: *See—*
Castela, Andre; Susbielles, Gilles; and Duc, Xuong Nguyen, 3,920,378.

Susnjara, Kenneth J., to Thermwood Corporation. Glaze wiping apparatus for graining furniture. 3,919,733, Cl. 15-23.000.

Sutherland, John D., to Westinghouse Electric Corporation. Shield plug access enclosure for a nuclear reactor. 3,920,512, Cl. 176-87.000.

Sutliff, Robert C., to Eastman Kodak Company. Film cartridge. 3,920,198, Cl. 242-194.000.

Sutliff, Robert C.: *See—*
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Suzuki, Akira: *See—*
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Suzuki, Kouzi, to Sanyo Electric Company, Ltd.; and Tokyo Sanyo Electric Co., Ltd. Noise reduction apparatus. 3,921,077, Cl. 325-477.000.

Suzuki, Takashi: *See—*
Yaginuma, Hiroshi; Suzuki, Takashi; and Kimi, Atutane, 3,920,769.

Suzuki, Tosho; Awano, Koichi; and Katsuhisa, Ogino. Coated polymeric paper films and a method of producing the same. 3,920,875, Cl. 117-36.700.

Svarz, Jerry J.; Goretta, Louis A.; and Seale, Virgil L., to Nalco Chemical Company. Method of producing acrylamide with a raney copper catalyst. 3,920,740, Cl. 260-561.00N.

Svenska Rotor Maskiner Altiebolag: *See—*
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Swanson, Sydney Alan Vasey; and Roper, Brian Arnold, to National Research Development Corporation. Endoprosthetic elbow joint devices. 3,919,725, Cl. 3-1.910.

Swanton, Paul C.: *See—*
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Swarsab Mining, Exploration & Development Company (Proprietary) Limited: *See—*
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Swarsab Mining, Exploration & Development (Proprietary) Limited: *See—*
Pittie, Willem Hubert; Overbeek, Gerhardus; and Doig, Kingsley Ferguson, 3,920,789.

Swift, Joseph A., to Xerox Corporation. Moisture stable bias transfer roll. 3,920,325, Cl. 355-3.00R.

Swindler, Henry A.: *See—*
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Szmulewicz, Sol: *See—*
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Szoeke, Joseph. Cigarette matches. 3,920,119, Cl. 206-92.000.

Szymansky, Edward, to Sperry Rand Corporation. Pad gripping device. 3,920,148, Cl. 220-94.00R.

Tacheci, Heinrich: *See—*
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Tachibana, Kooichi: *See—*
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Tahara, Susumu; Nagai, Shigeki; Hayashi, Yurio; Hoshide, Kou; Kawazoe, Shigenori; Harada, Katsuzo; and Yamamoto, Koichi, to Ube Industries, Ltd. Method for preparing catechol and hydroquinone. 3,920,756, Cl. 260-621.00G.

Tahara, Tetsuya: *See—*
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Tait Inc.: *See—*
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Tajima, Hidemi: *See—*
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Takahara, Kenji: *See—*
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Takahashi, Chiyomaru; Kaneko, Tadao; Sakabe, Akira; Sakagami, Mitsuhiro; and Arai, Kunio, to Hitachi, Ltd. and Kawasaki Steel Corporation. Method and apparatus for automatic welding of steel pipes. 3,920,946, Cl. 219-60.00A.

Takahashi, Junichi: *See—*
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Takahashi, Katuhiko: *See—*
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Takahashi, Koji: *See—*
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Takahashi, Tohru; and Sugimoto, Hachiro, to Eisai Co., Ltd. Quinazoline compounds. 3,920,636, Cl. 260-240.00J.

Takamatsu, Kiyotaka: *See—*
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Takao, Masateru: *See—*
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Takasago Perfumery Co., Ltd.: *See—*
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Takechi, Hiroshi: *See—*
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Takekoshi, Tohru, to General Electric Company. Method for preparing N-substituted nitrophthalimides. 3,920,697, Cl. 260-326.00N.

Takeuchi, Hirokazu. Bearing made of plastics. 3,920,293, Cl. 308-191.000.

Talbert, David F., to Westvaco Corporation. Air cushion unwind support for reeled sheet. 3,920,136, Cl. 242-55.000.

Tamai, Kazuto, to Kabushiki Kaisha Suwa Seikosha; and Shinshu Seiki Kabushiki Kaisha. Platen roll arrangement for typewheel printer. 3,920,113, Cl. 197-51.000.

Tamaki, Tokuo: *See—*
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Tamura, Masao: *See—*
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Tanaka, Kinji: *See—*
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Tanaka, Masaru; Oku, Takeshi; and Matsumoto, Yoshimitsu, to Matsushita Electric Industrial Co., Ltd. Device for compensating AC power source voltage. 3,921,058, Cl. 323-19.000.

Tanaka, Tahee: *See—*
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Tanaka, Tutomu; Hirakawa, Tamotsu; and Takahara, Kenji, to Kanegafuchi Chemical Industries Co., Ltd. Fermentation process for producing optically active L-lysine. 3,920,520, Cl. 195-30.000.

Tanaka, Yoshiaki: *See—*
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Tanigaichi, Mineaki: *See—*
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Taniguchi, Satoshi, to Kabushiki Kaisha Hitachi Seisakusho. Plated ferromagnetic wire for wire memory. 3,920,409, Cl. 29-191.600.

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Taska, Eileen R. Segmented inclined plane for use in teaching children the concept of directionality. 3,919,786, Cl. 35-35.00J.

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Tate, Louis David, to Bell Telephone Laboratories, Incorporated. Key telephone system. 3,920,929, Cl. 179-99.000.

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Taya, Shunroku; and Matsuda, Hisashi, to Hitachi, Ltd. Mass spectrometer. 3,920,988, Cl. 250-296.000.

Tayama, Suehiro: *See—*
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Terai, Akio; Kawamura, Eiji; and Fukumoto, Hisashi, to Kabushiki Kaisha Komatsu Seisakusho. Conduit arrangement for tilt cylinder of bulldozer. 3,920,081, Cl. 172-801.000.

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Testone, Anthony Q. Moving web energized static eliminator and method. 3,921,037, Cl. 317-2.00F.

Teti, John; and Yallourakis, Michael D., to Du Pont de Nemours, E. I., and Company. Corrosion-resistant perfluorocarbon polymer coated metal substrate and process for preparing the same. 3,920,793, Cl. 428-215.000.

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Thomas & Betts Corporation: *See—*
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Thomas, David F.; and Kafka, William L., to Waterous Company. Gear shift with positive lock means. 3,920,109, Cl. 192-114.000.

Thomas, James Houghton, to L.M. Ericsson Pty Lid. Pulse edge coincidence detection circuit for digital data transmission using diphase data sync. 3,920,918, Cl. 179-15.0BS.

Thomas, Klaus: *See—*
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Thompson, David A., to International Business Machines Corporation. Three-legged magnetic recording head using a magnetorestive element. 3,921,217, Cl. 360-113.000.

Thompson, Harold C.: *See—*
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Thompson, John Edward, to Post Office, The. Digital encoding system. 3,921,204, Cl. 358-13.000.

Thompson, John T.: *See—*
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Thomson, Don N., to United States of America, Navy. Accurate normalization for a monopulse radar. 3,921,173, Cl. 343-16.00M.

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Thorsman, Oswald Willy, deceased; by Thorsman, Morg, administratrix; and by Ahlstrand, Bengt, administratrix. Fastener for mounting in through hole particularly in wall or ceiling panel or the like. 3,919,917, Cl. 85-74.000.

Thuen, Torbjorn: *See—*
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Todd, William L. Conversion bracket for gas engine carburetor. 3,919,995, Cl. 123-195.00A.
Toft, Kaj; and Walker, Wendell C., to General Electric Company. Extra capacity steam iron. 3,919,793, Cl. 38-77.830.
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Toyama, Teruhiko: *See—*
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Toyoda Kikai Kogyo Kabushiki Kaisha: *See—*
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Trelleborgs Gummifabrik Aktiebolag: *See—*
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TRW Inc.: *See—*
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Martin, Daniel T.; Serrell, Morton A.; Coleman, Herbert C.; Cooper, Donald L.; Knox, Robert M.; Barnfield, Curtis L.; and Walinchus, Robert J., 3,920,967.
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Walsh, John Joseph; Hayes, Elmer Allen; and Schmidt, Jan, to Dorr-Oliver Incorporated. Concentric double-pipe horizontal heat exchanger for fiber containing fluids. 3,920,068, Cl. 165-143.000.

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Wasson, Burton Kendall; and Rooney, Clarence Stanley, to Merck Sharp & Dohme (I.A.). 5-(3-Substituted amino-2-hydroxypropoxy)-1,3-disubstituted pyrazoles and method of preparation. 3,920,691, Cl. 260-310.00R.

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## JANUARY 28, 1975 NOW ISSUED AS PATENTS

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| B 24,017 | 3,914,140 | Oct. 21, 1975 | B 331,895 | 3,916,403 | Oct. 28, 1975 |
| B 24,018 | 3,914,206 | Oct. 21, 1975 | B 333,876 | 3,921,208 | Nov. 18, 1975 |
| B 64,868 | 3,914,141 | Oct. 21, 1975 | B 334,868 | 3,919,469 | Nov. 11, 1975 |
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| B 248,916 | 3,920,862 | Nov. 18, 1975 | B 343,577 | 3,921,165 | Nov. 18, 1975 |
| B 251,109 | 3,914,148 | Oct. 21, 1975 | B 345,060 | 3,916,018 | Oct. 28, 1975 |
| B 251,635 | 3,914,149 | Oct. 21, 1975 | B 345,384 | 3,916,146 | Oct. 28, 1975 |
| B 254,211 | 3,917,677 | Nov. 4, 1975 | B 345,422 | 3,914,392 | Oct. 21, 1975 |
| B 258,687 | 3,914,221 | Oct. 21, 1975 | B 345,567 | 3,913,985 | Oct. 21, 1975 |
| B 261,378 | 3,913,468 | Oct. 21, 1975 | B 346,165 | 3,913,293 | Oct. 21, 1975 |
| B 262,287 | 3,921,209 | Nov. 18, 1975 | B 346,210 | 3,916,142 | Oct. 28, 1975 |
| B 262,378 | 3,914,410 | Oct. 21, 1975 | B 346,350 | 3,915,824 | Oct. 28, 1975 |
| B 265,727 | 3,914,479 | Oct. 21, 1975 | B 346,585 | 3,913,820 | Oct. 21, 1975 |
| B 265,862 | 3,915,915 | Oct. 28, 1975 | B 346,901 | 3,915,583 | Oct. 28, 1975 |
| B 269,673 | 3,914,377 | Oct. 21, 1975 | B 348,495 | 3,914,654 | Oct. 21, 1975 |
| B 276,271 | 3,916,028 | Oct. 28, 1975 | B 348,558 | 3,914,109 | Oct. 21, 1975 |
| B 276,560 | 3,916,030 | Oct. 28, 1975 | B 349,141 | 3,915,363 | Oct. 28, 1975 |
| B 278,491 | 3,921,170 | Nov. 18, 1975 | B 349,177 | 3,914,033 | Oct. 21, 1975 |
| B 278,991 | 3,914,469 | Oct. 21, 1975 | B 349,231 | 3,915,831 | Oct. 28, 1975 |
| B 280,395 | 3,919,604 | Nov. 11, 1975 | B 349,321 | 3,916,103 | Oct. 28, 1975 |
| B 281,341 | 3,920,643 | Nov. 18, 1975 | B 349,948 | 3,914,557 | Oct. 21, 1975 |
| B 282,081 | 3,913,483 | Oct. 21, 1975 | B 350,219 | 3,917,802 | Nov. 4, 1975 |
| B 284,297 | 3,913,722 | Oct. 21, 1975 | B 350,245 | 3,914,331 | Oct. 21, 1975 |
| B 285,796 | 3,914,303 | Oct. 21, 1975 | B 350,843 | 3,915,461 | Oct. 28, 1975 |
| B 286,499 | 3,914,129 | Oct. 21, 1975 | B 351,055 | 3,914,074 | Oct. 21, 1975 |
| B 287,164 | 3,914,139 | Oct. 21, 1975 | B 351,218 | 3,914,186 | Oct. 21, 1975 |
| B 287,373 | 3,918,568 | Nov. 11, 1975 | B 351,222 | 3,921,179 | Nov. 18, 1975 |
| B 288,627 | 3,916,179 | Oct. 28, 1975 | B 351,421 | 3,914,733 | Oct. 21, 1975 |
| B 289,471 | 3,917,184 | Nov. 4, 1975 | B 351,493 | 3,914,758 | Oct. 21, 1975 |
| B 289,523 | 3,921,166 | Nov. 18, 1975 | B 351,535 | 3,915,239 | Oct. 28, 1975 |
| B 292,054 | 3,915,877 | Oct. 28, 1975 | B 351,665 | 3,919,701 | Nov. 11, 1975 |
| B 292,126 | 3,914,465 | Oct. 21, 1975 | B 351,672 | 3,914,000 | Oct. 21, 1975 |
| B 292,140 | 3,914,340 | Oct. 21, 1975 | B 351,735 | 3,913,385 | Oct. 21, 1975 |
| B 293,437 | 3,913,414 | Oct. 21, 1975 | B 351,863 | 3,914,700 | Oct. 21, 1975 |
| B 294,579 | 3,916,737 | Nov. 4, 1975 | B 351,926 | 3,914,133 | Oct. 21, 1975 |
| B 294,673 | 3,916,023 | Oct. 28, 1975 | B 351,939 | 3,913,480 | Oct. 21, 1975 |
| B 295,674 | 3,916,107 | Oct. 28, 1975 | B 352,934 | 3,913,692 | Oct. 21, 1975 |
| B 299,267 | 3,917,106 | Nov. 4, 1975 | B 353,317 | 3,916,446 | Nov. 4, 1975 |
| B 303,702 | 3,914,131 | Oct. 21, 1975 | B 353,546 | 3,913,273 | Oct. 21, 1975 |
| B 305,417 | 3,915,882 | Oct. 28, 1975 | B 354,296 | 3,914,580 | Oct. 21, 1975 |
| B 306,938 | 3,916,050 | Oct. 28, 1975 | B 354,889 | 3,913,204 | Oct. 21, 1975 |
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| B 308,892 | 3,919,624 | Nov. 11, 1975 | B 355,269 | 3,914,561 | Oct. 21, 1975 |
| B 309,207 | 3,914,743 | Oct. 21, 1975 | B 355,510 | 3,913,704 | Oct. 21, 1975 |
| B 309,755 | 3,919,468 | Nov. 11, 1975 | B 357,057 | 3,913,738 | Oct. 21, 1975 |
| B 309,756 | 3,914,136 | Oct. 21, 1975 | B 357,402 | 3,914,180 | Oct. 21, 1975 |
| B 311,317 | 3,918,975 | Nov. 11, 1975 | B 357,803 | 3,919,470 | Nov. 11, 1975 |
| B 313,900 | 3,915,932 | Oct. 28, 1975 | B 358,244 | 3,913,411 | Oct. 21, 1975 |
| B 314,049 | 3,920,588 | Nov. 18, 1975 | B 359,174 | 3,914,117 | Oct. 21, 1975 |
| B 315,363 | 3,920,673 | Nov. 18, 1975 | B 359,540 | 3,915,235 | Oct. 28, 1975 |
| B 315,731 | 3,914,108 | Oct. 21, 1975 | B 359,946 | 3,914,132 | Oct. 21, 1975 |
| B 316,014 | 3,920,861 | Nov. 18, 1975 | B 359,947 | 3,914,653 | Oct. 21, 1975 |
| B 316,239 | 3,913,546 | Oct. 21, 1975 | B 360,296 | 3,916,720 | Nov. 4, 1975 |
| B 318,195 | 3,915,699 | Oct. 28, 1975 | B 360,719 | 3,915,715 | Oct. 28, 1975 |
| B 318,618 | 3,915,365 | Oct. 28, 1975 | B 361,569 | 3,914,554 | Oct. 21, 1975 |
| B 318,745 | 3,916,571 | Nov. 4, 1975 | B 361,734 | 3,915,764 | Oct. 28, 1975 |
| B 319,339 | 3,916,056 | Oct. 28, 1975 | B 362,589 | 3,914,012 | Oct. 21, 1975 |
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| B 320,603 | 3,915,571 | Oct. 28, 1975 | B 364,022 | 3,913,499 | Oct. 21, 1975 |
| B 321,101 | 3,917,163 | Nov. 4, 1975 | B 364,163 | 3,916,092 | Oct. 28, 1975 |
| B 322,239 | 3,920,973 | Nov. 18, 1975 | B 364,241 | 3,916,668 | Nov. 4, 1975 |
| B 322,564 | 3,914,373 | Oct. 21, 1975 | B 364,528 | 3,919,510 | Nov. 11, 1975 |
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| B 323,191 | 3,914,566 | Oct. 21, 1975 | B 365,834 | 3,914,702 | Oct. 21, 1975 |
| B 323,203 | 3,916,165 | Oct. 28, 1975 | B 365,855 | 3,917,258 | Nov. 4, 1975 |
| B 323,568 | 3,920,536 | Nov. 18, 1975 | B 366,589 | 3,914,719 | Oct. 21, 1975 |
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| B 328,164 | 3,914,703 | Oct. 21, 1975 | B 367,661 | 3,914,158 | Oct. 21, 1975 |
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| B 328,870 | 3,916,486 | Nov. 4, 1975 | B 371,787 | 3,921,217 | Nov. 18, 1975 |
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| B 330,828 | 3,913,589 | Oct. 21, 1975 | B 373,428 | 3,915,511 | Oct. 28, 1975 |
| B 331,417 | 3,914,157 | Oct. 21, 1975 | B 375,220 | 3,920,417 | Nov. 18, 1975 |
| B 331,557 | 3,916,577 | Nov. 4, 1975 | B 376,504 | 3,914,570 | Oct. 21, 1975 |

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# LIST OF REISSUE PATENTEES

## TO WHOM

## PATENTS WERE ISSUED ON THE 18TH DAY OF NOVEMBER, 1975

NOTE.—Arranged in accordance with the first significant character or word of the name (in accordance with city and telephone directory practice).

**Advanced Instrument Development, Inc.:** *See—*
Fiocca, Louis L., Re. 28,618.

**Bolt, Harry Collett.** Shower cabinet. Re. 28,613, Cl. 4-146.000.

**Brown & Root, Inc.:** *See—*
Crout, Jesse W.; Koehler, Albert M.; and Shaw, Larry K., Re. 28,614.

**Crout, Jesse W.; Koehler, Albert M.; and Shaw, Larry K., to Brown & Root, Inc.** Method and apparatus for transporting and launching an offshore tower. Re. 28,614, Cl. 61-46.500.

**Entoleter, Inc.:** *See—*
Yankura, Eugene S., Re. 28,616.

**Fiocca, Louis L., to Advanced Instrument Development, Inc.** Solid-state power supply system for rotating anode X-ray tubes. Re. 28,618, Cl. 318-227.000.

**Joslyn Mfg. and Supply Co.:** *See—*
Kawiecki, Chester J., Re. 28,619.

**Kawiecki, Chester J., to Joslyn Mfg. and Supply Co.** Unitary series spark gap with aligned apertures. Re. 28,619, Cl. 315-203.000.

**Keiper, David A.** Hydrofoil sailing craft. Re. 28,615, Cl. 114-66.50H.

**Koehler, Albert M.:** *See—*
Crout, Jesse W.; Koehler, Albert M.; and Shaw, Larry K., Re. 28,614.

**McShan, Clarence Hunter.** Stereo multiplex decoding system with a phase locked loop switching signal control. Re. 28,617, Cl. 179-15.0BT.

**Shaw, Larry K.:** *See—*
Crout, Jesse W.; Koehler, Albert M.; and Shaw, Larry K., Re. 28,614.

**Yankura, Eugene S., to Entoleter, Inc.** Mass contact between media of different densities. Re. 28,616, Cl. 55-92.000.

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Ball, Geo. J., Inc.: *See—*
Fischer, Arnold W. 3,807.

Fischer, Arnold W., to Geo. J. Ball, Inc. African violet entitled ulli. 3,807, 11–18–75, Cl. 69.

Fountain, Merle M. Peach tree. 3,806, 11–18–75, Cl. 43.

Kirsch, Ted T. Lily plant (yellow jewel). 3,805, 11–18–75, Cl. 68.

# LIST OF DESIGN PATENTEES

AB Gustavsbergs Fabriker: *See—*
Benktzon, Maria, and Juhlin. 237,676.

Aktiebolaget Svenska Flaktfabriken: *See—*
Johansson, Leif. 237,711.

Anderson, Charles R. Lettering and writing pen. 237,705, 11–18–75, Cl. D19—45.

Apeco Corp.: *See—*
Brennan, John J., and Clark. 237,698.

Backus, Barry A. Disposable food tray. 237,679, 11–18–75, Cl. D7—38.

Baldwin, D.H., Co.: *See—*
Kimble, Thomas E. 237,741.

Bauer, Frederick K. Traveling case for garments. 237,752, 11–18–75, Cl. D87—1.

Behnk, Donald J., and J. E. Edgell, to Disston, Inc. Cordless electric grass shear. 237,683, 11–18–75, Cl. D8—8.

Benktzon, Maria, and S.-E. Juhlin, to AB Gustavsbergs Fabriker. Combined foodstuff slicer guide and slicing knife. 237,676, 11–18–75, Cl. D7—43.

Bernhardt, Daniel. Food container package. 237,687, 11–18–75, Cl. D9—192.

Bertleson, Warren C. Folding rack for doll clothes or similar article. 237,660, 11–18–75, Cl. D6—6.

Black, John D. Wall socket template. 237,691, 11–18–75, Cl. D10—64.

Black, John D. Switch plate template. 237,692, 11–18–75, Cl. D10—64.

Blain, Rolando V. Mute for a fretted stringed musical instrument. 237,740, 11–18–75, Cl. D56—1.

Block China Corp.: *See—*
Gulotta, Gerald. 237,677.

Boman, Stig, and R. Wallin, to Molnlycke AB. Spool holder. 237,658, 11–18–75, Cl. D3—19.

Bottger, Wolfgang J. E., to Bottger Kommanditgesellschaft. Combined bottle and dispensing cup. 237,688, 11–18–75, Cl. D9—10.

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Bottger, Wolfgang J. E. 237,688.

Box, Theodor. Flower pot. 237,731, 11–18–75, Cl. D35—3.

Bozich, Robert A., to Malton Electric Co. Housing for exterior electrical receptacles. 237,718, 11–18–75, Cl. D26—12.

Braun Aktiengeselischaft: *See—*
Oberheim, Robert. 237,743.
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337 3,919,874
369 3,919,875
451 3,919,876
456 3,919,877
3,919,878

**CLASS 73**
16 3,919,879
49.8 3,919,880
67.5H 3,919,881
71.4 3,919,883
95 3,919,884
119A 3,919,885
146 3,919,882
160 3,919,886
251 3,919,887
291 3,919,888
485 3,919,889

**CLASS 74**
89 3,919,890
217B 3,919,891
231P 3,919,892
242.15R 3,919,893
384 3,919,894
394 3,919,895
474 3,919,896
501.5R 3,919,897
594.2 3,919,898
713 3,919,899

**CLASS 75**
51 3,920,446
60 3,920,447
3,920,448
97R 3,920,449
101BE 3,920,450
130R 3,920,451
200 3,920,452

**CLASS 76**
27 3,919,900

**CLASS 81**
3.4 3,919,901
57.16 3,919,902
419 3,919,903

**CLASS 82**
47 3,919,904

**CLASS 83**
205 3,919,905
294 3,919,906
368 3,919,907
471.2 3,919,908
530 3,919,909

**CLASS 84**
1.15 3,919,910
1.27 3,919,911
282 3,919,912
454 3,919,913
474 3,919,914
484 3,919,915

**CLASS 85**
68 3,919,916
74 3,919,917

**CLASS 89**
42B 3,919,918
132 3,919,921

**CLASS 90**
13.05 3,919,920
13.1 3,919,919

**CLASS 91**
37 3,919,922
51 3,919,923

**CLASS 93**
59R 3,919,924
94PS 3,919,925

**CLASS 96**
1.4 3,920,453
36 3,920,454
75 3,920,455
87R 3,920,456
90R 3,920,457
99 3,920,458

**CLASS 98**
2.03 3,919,926
2.17 3,919,927
40D 3,919,928
41 3,919,929
50 3,919,930

**CLASS 99**
533 3,919,931

**CLASS 100**
228 3,919,932

**CLASS 101**
93.04 3,919,935
93.14 3,919,936
93.29 3,919,934
93.32 3,919,933
378 3,919,937
401.1 3,919,938

**CLASS 102**
7.2 3,919,939
24R 3,919,940
78 3,919,941

**CLASS 104**
7R 3,919,943
23R 3,919,944
50 3,919,945
94 3,919,946
124 3,919,947

**CLASS 105**
34R 3,919,948

**CLASS 106**
15FP 3,920,459
38.3 3,920,460
47R 3,920,461
52 3,920,462
54 3,920,463
58 3,920,464
114 3,920,465
117 3,920,466
273 3,920,467
286 3,920,468
288B 3,920,470
288Q 3,920,469

**CLASS 108**
27 3,919,949
114 3,919,950

**CLASS 111**
7 3,919,951

**CLASS 112**
79R 3,919,952
3,919,953
121.29 3,919,954
166 3,919,942

**CLASS 113**
1N 3,919,955

**CLASS 114**
.5D 3,919,957
3,919,958
.5R 3,919,956
26 3,919,959
66.5H Re.28,615
77R 3,919,960
144E 3,919,961
169 3,919,962
235WS 3,919,963

**CLASS 115**
34R 3,919,964
35 3,919,965

**CLASS 116**
124.1A 3,919,966

**CLASS 118**
2 3,919,967
5 3,919,968
13 3,919,969
203 3,919,970
259 3,919,971
406 3,919,973
410 3,919,974

**CLASS 119**
14.05 3,919,975
16 3,919,976
18 3,919,977
19 3,919,978
157 3,919,979

**CLASS 123**
8.45 3,919,980
32EA 3,919,981
3,919,983
32SP 3,919,984
3,919,985
32E 3,919,982
75E 3,919,986
117R 3,919,987
119E 3,919,988
139AC 3,919,990
139AW 3,919,992
139R 3,919,989
148DS 3,919,994
148E 3,919,993
182 3,919,991
195A 3,919,995

**CLASS 124**
19 3,919,996
41A 3,919,997

**CLASS 126**
270 3,919,998

**CLASS 128**
1B 3,919,999
3,920,000
2F 3,920,001
2R 3,920,002
2.05A 3,920,004
2.06E 3,920,012
2.06R 3,920,005
2.1Z 3,920,003
24.1 3,920,006
79 3,920,007
96 3,920,008
140R 3,920,009
156 3,920,010
204 3,920,011
214.4 3,920,013
230 3,920,014
284 3,920,015
287 3,920,016
3,920,017
3,920,018
3,920,019
290 3,920,020
303.13 3,920,022
303.17 3,920,021
347 3,920,023
419PG 3,920,024
423 3,920,025

**CLASS 131**
17R 3,920,026
3,920,027
236 3,920,028

**CLASS 133**
2 3,920,029

**CLASS 134**
3 3,920,471
6 3,920,472
58R 3,920,030

**CLASS 136**
65 3,920,473
86A 3,920,475
86E 3,920,474
100R 3,920,476
108 3,920,477
111 3,920,478
148 3,920,479
205 3,920,480

**CLASS 137**
67 3,920,031
68 3,920,032
81 3,920,033
116 3,920,034
117 3,920,035
315 3,920,036
318 3,920,037
330 3,920,038
344 3,920,039
458 3,920,040
523 3,920,042
599 3,920,041
625.17 3,920,043
625.3 3,920,044

627.5 3,920,045
3,920,046
**CLASS 138**
30 3,920,047
89 3,920,048
109 3,920,049
110 3,920,050
155 3,920,051
**CLASS 139**
25 3,920,052
319 3,920,053
421 3,920,054
**CLASS 140**
147 3,920,055
**CLASS 141**
94 3,920,056
**CLASS 144**
34E 3,920,057
312 3,920,058
**CLASS 148**
1.5 3,920,481
3,920,482
3,920,483
3,920,484
6.14R 3,920,486
6.27 3,920,488
6.3 3,920,485
12C 3,920,487
12.4 3,920,490
32 3,920,489
175 3,920,491
3,920,492
187 3,920,493
**CLASS 149**
19.3 3,920,494
**CLASS 151**
41.72 3,920,059
70 3,920,060
**CLASS 152**
330RF 3,920,061
**CLASS 156**
8 3,920,495
82 3,920,496
94 3,920,497
96 3,920,498
240 3,920,499
251 3,920,500
364 3,920,501
504 3,920,502
580 3,920,503
3,920,504
**CLASS 159**
47WL 3,920,505
**CLASS 162**
31 3,920,506
157R 3,920,507
3,920,508
3,920,509
162 3,920,510
348 3,920,511
**CLASS 164**
4 3,920,062
55 3,920,063
273R 3,920,064
282 3,920,065
**CLASS 165**
4 3,920,066
38 3,920,067
143 3,920,068
150 3,920,069
**CLASS 166**
55.8 3,920,070
182 3,920,071
248 3,920,072
274 3,920,073
3,920,074
290 3,920,075
315 3,920,076
**CLASS 172**
33 3,920,077
39 3,920,078
59 3,920,079
447 3,920,080
801 3,920,081
**CLASS 173**
12 3,920,082
49 3,920,083
79 3,920,084
99 3,920,085
134 3,920,086
164 3,920,087
169 3,920,088
**CLASS 174**
21R 3,920,884
28 3,920,885
93 3,920,886
148 3,920,887
152GM 3,920,888
**CLASS 175**
53 3,920,089
60 3,920,090
**CLASS 176**
20 3,920,513
38 3,920,514
78 3,920,515
3,920,516
3,920,517
87 3,920,512
3,920,518
**CLASS 178**
6.8 3,920,889
3,920,890
7.3R 3,920,891
3,920,892
7.5R 3,920,893
22 3,920,894
26R 3,920,895
3,920,896
66R 3,920,897
68 3,920,898
69G 3,920,899
69.5G 3,920,901
69.5R 3,920,900
**CLASS 179**
1VC 3,920,907
1B 3,920,906
1D 3,920,903
1G 3,920,904
1J 3,920,905
2CA 3,920,908
6R 3,920,909
3,920,910
7.1TP 3,920,911
3,920,912
8A 3,920,913
15AL 3,920,916
15AT 3,920,914
15BF 3,920,921
15BS 3,920,915
3,920,918
3,920,919
15BT Re.28,617
15BY 3,920,920
15A 3,920,917
18AB 3,920,924
18DA 3,920,936
18GF 3,920,923
18HA 3,920,922
78R 3,920,925
90B 3,920,926
98 3,920,927
99 3,920,902
3,920,928
3,920,929
100.41T 3,920,930
107FD 3,920,931
170R 3,920,932
175.2C 3,920,933
175.2R 3,920,934
175.3R 3,920,935
**CLASS 180**
5R 3,920,091
6.48 3,920,092
21 3,920,093
**CLASS 181**
42 3,920,095
**CLASS 182**
63 3,920,096
107 3,920,097
**CLASS 184**
5 3,920,098
55A 3,920,099
**CLASS 186**
1A 3,920,100
**CLASS 187**
98 3,920,101
**CLASS 188**
71.9 3,920,102
3,920,103
73.3 3,920,104
**CLASS 191**
22R 3,920,105
**CLASS 192**
33C 3,920,106
98 3,920,107
107R 3,920,108
114 3,920,109
**CLASS 194**
102 3,920,112
**CLASS 195**
28N 3,920,519
30 3,920,520
55 3,920,521
80R 3,920,522
**CLASS 197**
51 3,920,113
107 3,920,114
**CLASS 198**
109 3,920,115
128 3,920,116
194 3,920,117
262 3,920,118
**CLASS 200**
44 3,920,937
50AA 3,920,938
3,920,939
52R 3,920,940
144B 3,920,941
3,920,942
159R 3,920,943
**CLASS 203**
37 3,920,523
**CLASS 204**
28 3,920,524
3,920,525
47 3,920,526
51 3,920,527
55R 3,920,528
92 3,920,551
110 3,920,403
128 3,920,529
152 3,920,530
157.1R 3,920,531
181 3,920,532
192 3,920,533
282 3,920,534
290F 3,920,535
**CLASS 206**
92 3,920,119
217 3,920,120
330 3,920,121
390 3,920,122
497 3,920,123
**CLASS 208**
10 3,920,536
48R 3,920,537
89 3,920,538
216 3,920,539
248 3,920,540
**CLASS 209**
74R 3,920,541
111.7 3,920,124
134 3,920,542
222 3,920,543
**CLASS 210**
25 3,920,544
30 3,920,545
54 3,920,546
63 3,920,547
3,920,548
83 3,920,549
86 3,920,550
141 3,920,552
232 3,920,553
247 3,920,554
321 3,920,555
3,920,556
516 3,920,557
527 3,920,558
**CLASS 211**
4 3,920,125
5 3,920,126
118 3,920,127
**CLASS 214**
1BD 3,920,130
3,920,131
1BV 3,920,128
1Q 3,920,129
6DS 3,920,132
6B 3,920,133
43 3,920,134
53 3,920,135
140 3,920,137
152 3,920,138
765 3,920,139
**CLASS 215**
100R 3,920,140
251 3,920,141
254 3,920,142
307 3,920,143
**CLASS 219**
10.55M 3,920,944
10.55R 3,920,945
60A 3,920,946
69M 3,920,947
76 3,920,948
85 3,920,949
88 3,920,950
121L 3,920,951
216 3,920,952
378 3,920,953
441 3,920,954
501 3,920,955
503 3,920,956
523 3,920,963
**CLASS 220**
22 3,920,144
86AT 3,920,145
90.4 3,920,146
94R 3,920,147
3,920,148
**CLASS 221**
198 3,920,150
232 3,920,151
236 3,920,152
**CLASS 222**
1 3,920,149
14 3,920,153
23 3,920,154
3,920,155
80 3,920,156
100 3,920,157
135 3,920,158
146H 3,920,159
162 3,920,160
176 3,920,161
182 3,920,162
190 3,920,163
385 3,920,164
402.23 3,920,165
**CLASS 224**
5Z 3,920,166
42.1F 3,920,167
**CLASS 225**
103 3,920,168
**CLASS 227**
136 3,920,169
**CLASS 228**
5.1 3,920,170
44.5 3,920,171
124 3,920,172
147 3,920,173
155 3,920,174
173 3,920,175
183 3,920,176
185 3,919,764
218 3,920,177
**CLASS 229**
2.5 3,920,178
63 3,920,179
3,920,180
**CLASS 233**
2 3,920,181
**CLASS 235**
61.11D 3,920,960
3,921,196
61.11E 3,920,958
3,920,959
61.11R 3,920,957
92ST 3,920,962
92T 3,920,961
94R 3,920,964
150.1 3,920,965
150.2 3,920,966
150.24 3,920,967
151.1 3,920,968
151.11 3,920,971
3,920,972
151.3 3,920,969
3,920,970
151.31 3,920,973
152 3,920,974
153AE 3,920,977
153AK 3,920,975
153AM 3,920,976
156 3,920,978
168 3,920,979
**CLASS 238**
25 3,920,182
283 3,920,183
**CLASS 239**
10 3,920,184
102 3,920,185
280.5 3,920,186
400 3,920,187
403 3,920,188
526 3,920,189
**CLASS 240**
1LP 3,920,980
22 3,920,981
**CLASS 241**
30 3,920,190
182 3,920,191
**CLASS 242**
18A 3,920,193
55 3,920,136
3,920,192
85 3,920,194
180 3,920,195
194 3,920,196
3,920,197
3,920,198
**CLASS 244**
3.16 3,920,200
3.2 3,920,199
16 3,920,201
17.27 3,920,202
42CC 3,920,203
111 3,920,204
118R 3,920,205
132 3,920,206
**CLASS 248**
42 3,920,207
56 3,920,208
162 3,920,209
290 3,920,210
311 3,920,211
346 3,920,212
464 3,920,213
**CLASS 249**
40 3,920,214
**CLASS 250**
199 3,920,982
3,920,983
202 3,920,316
277 3,920,984
281 3,920,985
282 3,920,986
3,920,987
296 3,920,988
307 3,920,989
309 3,920,990
315 3,920,991
3,920,992
343 3,920,993
347 3,920,994
432 3,920,995
459 3,920,996
468 3,920,997
484 3,920,998
493 3,920,999
505 3,921,000
510 3,921,001
533 3,921,002
557 3,921,003
**CLASS 251**
7 3,920,215
51 3,920,216
57 3,920,217
**CLASS 252**
8.5C 3,920,559
3,920,560
8.55C 3,920,566
8.75 3,920,563
3,920,564
3,920,565
8.8 3,920,561
25 3,920,571
32.5 3,920,567
32.7E 3,920,562
34.7 3,920,568
75 3,920,572
89 3,920,569
3,920,570
182 3,920,573
188.3 3,920,575
299 3,920,574
3,920,576
301.1W 3,920,577
313S 3,920,578
373 3,920,579
408 3,920,580
430 3,920,582
448 3,920,581
465 3,920,583
514 3,920,584
522 3,920,585
531 3,920,586
**CLASS 254**
67 3,920,219
98 3,920,220
114 3,920,218
**CLASS 256**
59 3,920,221
**CLASS 259**
1R 3,920,222
8 3,920,223
3,920,224
22 3,920,225
72 3,920,226
96 3,920,227
107 3,920,228
192 3,920,229
**CLASS 260**
2.5AH 3,920,587
2.5AY 3,920,588
2.5N 3,920,589
3,920,590
3,920,591
3,920,593
8 3,920,592
19R 3,920,594
22CQ 3,920,595
22R 3,920,596
3,920,597
29.2TN 3,920,598
29.6H 3,920,599
29.7UA 3,920,600
29.7N 3,920,601
31.2R 3,920,619
37N 3,920,602
40R 3,920,603
42.17 3,920,605
42.54 3,920,604
45.7R 3,920,606
45.8R 3,920,607
45.9NP 3,920,608
47CP 3,920,611
63UY 3,920,612
67.6R 3,920,614
75T 3,920,613
77.5AM 3,920,616
78UA 3,920,617
79.5C 3,920,618
80.78 3,920,620
3,920,621
3,920,622
92.3 3,920,623
94.7HA 3,920,773
94.9F 3,920,624
112B 3,920,625
112.5 3,920,626
3,920,627
210AB 3,920,628
3,920,629
211.5R 3,920,630
211.7 3,920,631
239.3B 3,920,633
239.3T 3,920,632
239.55R 3,920,634
239.57 3,920,635
240J 3,920,636
240R 3,920,637
243C 3,920,638
3,920,639
3,920,640
243R 3,920,641
244R 3,920,642
247 3,920,643
248NS 3,920,644
249.5 3,920,645
250BC 3,920,647
3,920,660
250A 3,920,646
251R 3,920,648
3,920,649
251.5 3,920,650
256.4C 3,920,653
256.4F 3,920,652
3,920,654
256.4N 3,920,651
256.4Q 3,920,655
257 3,920,656
268TR 3,920,659
270C 3,920,661
283S 3,920,662
285.5 3,920,663
3,920,664
286Q 3,920,665
286R 3,920,666
287CF 3,920,667
290HL 3,920,657
295CA 3,920,669
295R 3,920,668
295.5R 3,920,670
302E 3,920,671
306.7R 3,920,672
306.8D 3,920,674
306.8R 3,920,675
307F 3,920,673
307G 3,920,676
3,920,677
309 3,920,678
3,920,679
309.2 3,920,680
3,920,681
3,920,682
3,920,683
3,920,684
309.5 3,920,685
3,920,686
309.6 3,920,687
3,920,688
309.7 3,920,689
310R 3,920,690
3,920,691
3,920,693
314 3,920,692
315 3,920,694
322 3,920,695
326N 3,920,697
326S 3,920,696
326.11 3,920,699
326.5FM 3,920,698
327R 3,920,700
340.5 3,920,701
340.7 3,920,702
343.6 3,920,703
345.2 3,920,704
345.3 3,920,705
345.9 3,920,706
346.2R 3,920,707
348.5L 3,920,708
376 3,920,709
397.7R 3,920,710
399 3,920,711
429R 3,920,712
448AD 3,920,713
448.2E 3,920,714
3,920,715
449M 3,920,716
449.5 3,920,717
453P 3,920,718
465D 3,920,719

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465.8D
465.8R
468D
468G
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473S
482C
485H
486B
502.5
515R
524R
533A
534S
543F
556A
561N
577
580
583K
584C
586C
586E
586R
600A
601R
602
604HF
615A
621G
623H
631H
635A
635Y
656R
666PY
680B
683R
683.2
683.3
683.48
683.9
837R
894
897R
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23A
35
39B
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46.5
46.9
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98
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168
210R
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35
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94
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1D
57R
83R
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1F
85D
85F
95H
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131AB
186C
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23A
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465E 3,920,720
465.8D 3,920,722
465.8R 3,920,721
468D 3,920,723
3,920,724
3,920,726
468G 3,920,725
471C 3,920,727
3,920,728
473S 3,920,729
482C 3,920,730
485H 3,920,731
486B 3,920,732
502.5 3,920,733
515R 3,920,734
524R 3,920,735
533A 3,920,736
534S 3,920,737
543F 3,920,738
556A 3,920,739
561N 3,920,740
577 3,920,741
3,920,742
580 3,920,743
583K 3,920,744
584C 3,920,746
586C 3,920,747
586E 3,920,748
586R 3,920,749
600A 3,920,750
601R 3,920,751
3,920,752
602 3,920,753
604HF 3,920,754
615A 3,920,755
621G 3,920,756
623H 3,920,757
631H 3,920,758
635A 3,920,760
635Y 3,920,759
656R 3,920,761
666PY 3,920,762
680B 3,920,763
683R 3,920,764
683.2 3,920,765
683.3 3,920,615
683.48 3,920,767
683.9 3,920,745
3,920,766
837R 3,920,768
894 3,920,769
897R 3,920,770
943 3,920,771
944 3,920,772

**CLASS 261**

17 3,920,774
23A 3,920,775
35 3,920,776
39B 3,920,777
39D 3,920,778
87 3,920,779

**CLASS 264**

33 3,920,780
46.5 3,920,609
46.9 3,920,610
61 3,920,781
98 3,920,782
118 3,920,783
168 3,920,784
210R 3,920,785
251 3,920,786
263 3,920,787

**CLASS 266**

29 3,920,230

**CLASS 267**

35 3,920,231

**CLASS 269**

25 3,920,232
55 3,920,233
94 3,920,234
234 3,920,235

**CLASS 270**

58 3,920,236
62 3,920,237

**CLASS 271**

9 3,920,238
118 3,919,972

**CLASS 272**

1D 3,920,239
57R 3,920,240
83R 3,920,241

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1F 3,920,242
85D 3,920,244
85F 3,920,243
95H 3,920,245
127R 3,920,246
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186C 3,920,248

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23A 3,920,249

**CLASS 277**

51 3,920,250
53 3,920,251
188 3,920,252
189 3,920,253
206R 3,920,254

**CLASS 280**

5.26 3,920,255
11.35B 3,920,257
11.35T 3,920,256
33.99H 3,920,258
47.34 3,920,259
79.3 3,920,260
81.5 3,920,261
94 3,920,262
106 3,920,263
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150SB 3,920,265
150.5 3,920,094
446B 3,920,266

**CLASS 281**

16 3,920,267

**CLASS 285**

21 3,920,268
84 3,920,269
104 3,920,270
176 3,920,271

**CLASS 289**

18 3,920,272

**CLASS 292**

207 3,920,110
264 3,920,273

**CLASS 293**

70 3,920,274
97 3,920,111

**CLASS 294**

92 3,920,275

**CLASS 297**

142 3,920,276

**CLASS 299**

31 3,920,277

**CLASS 303**

21AF 3,920,280
3,920,284
21BE 3,920,278
21A 3,920,283
21F 3,920,279
3,920,282
21R 3,920,281
22R 3,920,285

**CLASS 305**

10 3,920,286

**CLASS 307**

10R 3,921,004
64 3,921,005
118 3,921,006
218 3,921,007
230 3,921,008
234 3,921,009
235A 3,921,010
251 3,921,011
271 3,921,012
296 3,921,013

**CLASS 308**

3.5 3,920,287
3,920,288
6C 3,920,289
6R 3,920,290
152 3,920,291
174 3,920,292
191 3,920,293
212 3,920,296

**CLASS 310**

8.1 3,921,014
3,921,015
9.1 3,921,016
216 3,921,017
270 3,921,018

**CLASS 312**

38 3,920,294
108 3,920,295
195 3,920,298
217 3,920,297
223 3,920,299

**CLASS 313**

62 3,921,019
123 3,921,020
188 3,921,021
309 3,921,022
357 3,921,023
404 3,921,024
437 3,921,025
501 3,921,026

**CLASS 315**

5.39 3,921,027
9 3,921,028
30 3,921,029
94 3,921,030
3,921,031
106 3,921,032
141 3,921,033
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241P 3,921,034
307 3,921,035
396 3,921,036

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127 3,921,045
203R 3,921,046
227 Re.28,618
313 3,921,047
480 3,921,048

**CLASS 320**

2 3,921,049
19 3,921,050
39 3,921,051
61 3,921,052

**CLASS 321**

2 3,921,053
3,921,054
18 3,921,197
24 3,921,055
69NL 3,921,056

**CLASS 322**

8 3,921,057

**CLASS 323**

19 3,921,058
21 3,921,059

**CLASS 324**

.5A 3,921,060
10 3,921,061
16R 3,921,062
28R 3,921,063
29.5 3,921,064
37 3,921,065
71CP 3,921,066
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98 3,921,068
107 3,921,069
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50 3,921,073
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320 3,921,075
321 3,921,076
477 3,921,077

**CLASS 328**

10 3,921,078
62 3,921,079
133 3,921,080
140 3,921,081

**CLASS 329**

110 3,921,082
3,921,083
3,921,084
116 3,921,085
204 3,921,086

**CLASS 330**

2 3,921,087
10 3,921,088
13 3,921,089
30D 3,921,090
3,921,091

**CLASS 331**

1A 3,921,093
3,921,094
3,921,095
1R 3,921,092
94.5C 3,921,096
94.5D 3,921,100
94.5G 3,921,097
3,921,098
94.5S 3,921,099
108D 3,921,101

**CLASS 332**

9R 3,921,102
11D 3,921,103

**CLASS 333**

28R 3,921,104
3,921,105
81R 3,921,106

**CLASS 335**

78 3,921,107
153 3,921,108
195 3,921,109
210 3,921,110
255 3,921,111

**CLASS 336**

58 3,921,112
84 3,921,113
90 3,921,114
192 3,921,115

**CLASS 337**

202 3,921,116
337 3,921,198

**CLASS 338**

13 3,921,117
89 3,921,118
217 3,921,119

**CLASS 339**

8R 3,920,300
17F 3,920,301
75MP 3,920,302
91R 3,920,303
94M 3,920,304
98 3,920,305
103M 3,920,306
111 3,920,307
119C 3,920,308
198G 3,920,309
256SP 3,920,310

**CLASS 340**

2 3,921,120
3E 3,921,121
3,921,123
3R 3,921,122
7R 3,921,124
3,921,125
15.5CP 3,921,126
32 3,921,127
52H 3,921,128
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64 3,921,130
139 3,921,131
146.1AG 3,921,132
146.2 3,921,133
3,921,134
146.3MA 3,921,135
146.3H 3,921,136
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166R 3,921,140
172.5 3,921,141
3,921,142
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347NT 3,921,165
365C 3,921,166
3,921,167
408 3,921,168

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16M 3,921,171
3,921,173
16R 3,921,172
112D 3,921,174
119 3,921,175
754 3,921,176
846 3,921,177

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73E 3,921,181
74ES 3,921,179
3,921,180

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96WG 3,920,314
96B 3,920,313
96R 3,920,312
184 3,920,315

**CLASS 351**

113 3,920,317

**CLASS 352**

35 3,920,318
39 3,920,319
89 3,920,320
177 3,920,321

**CLASS 353**

26 3,920,322
61 3,920,323
117 3,920,324

**CLASS 354**

15 3,921,182
23D 3,921,183
32 3,921,184
40 3,921,185
43 3,921,186
50 3,921,187
51 3,921,188
220 3,921,189
317 3,921,190

**CLASS 355**

3R 3,920,325
8 3,920,326
14 3,920,327
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15 3,920,329
16 3,920,331
39 3,920,330
64 3,920,332
76 3,920,333

**CLASS 356**

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138 3,920,335
201 3,920,336

**CLASS 357**

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13 3,921,192
23 3,921,193
24 3,921,194
3,921,195
58 3,921,199
67 3,921,200
82 3,921,201

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8 3,921,202
9 3,921,203
13 3,921,204
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**CLASS 360**

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17 3,921,208
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40 3,921,210
47 3,921,211
51 3,921,212
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60 3,921,214
72 3,921,220
74 3,921,215
106 3,921,216
113 3,921,217
3,921,218
121 3,921,219

**CLASS 401**

106 3,920,337

**CLASS 403**

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306 3,920,340
352 3,920,341
3,920,342
356 3,920,343
401 3,920,344
406 3,920,345

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72 3,920,348
98 3,920,349

**CLASS 408**

211 3,920,350

**CLASS 415**

163 3,920,351
200 3,920,352

**CLASS 416**

117 3,920,354
168 3,920,353

**CLASS 417**

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**CLASS 418**

61A 3,920,358
87 3,920,359
178 3,920,360
191 3,920,361

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22 3,920,789
3,920,790
3,920,791
140 3,920,794
242 3,920,795
276 3,920,825
313 3,920,796
321 3,920,797
329 3,920,798
341 3,920,799
432 3,920,800
477 3,920,801
490 3,920,802
579 3,920,803
580 3,920,395
650 3,920,804

**CLASS 424**

15 3,920,805
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45 3,920,843
46 3,920,808
59 3,920,807
78 3,920,883
80 3,920,809
3,920,810
88 3,920,811
115 3,920,812
3,920,813
3,920,814
156 3,920,792
175 3,920,815
195 3,920,816
242 3,920,817
244 3,920,818
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283 3,920,826
3,920,827
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3,920,830
3,920,831
3,920,832
301 3,920,847
303 3,920,833
305 3,920,834
311 3,920,835
312 3,920,848
315 3,920,836
317 3,920,837
319 3,920,838
3,920,839
325 3,920,840
327 3,920,841
3,920,842
330 3,920,844
331 3,920,845
346 3,920,846

**CLASS 425**

72 3,920,362
95 3,920,363
131.1 3,920,366
135 3,920,364
141 3,920,365
149 3,920,367
195 3,920,368
253 3,920,369
363 3,920,370
388 3,920,371
391 3,920,372
392 3,920,373
436R 3,920,374

**CLASS 426**

3 3,920,849
51 3,920,851
62 3,920,852
104 3,920,853
250 3,920,854
3,920,855
287 3,920,856
307 3,920,857
319 3,920,858
394 3,920,850
520 3,920,859

**CLASS 427**

87 3,920,860
88 3,920,861
131 3,920,862
145 3,920,863
169 3,920,864
220 3,920,865
224 3,920,866
245 3,920,875
354 3,920,868
372 3,920,867

**CLASS 428**

35 3,920,869
46 3,920,870
54 3,920,871
95 3,920,872
109 3,920,339
195 3,920,873
198 3,920,874
215 3,920,793
295 3,920,876
345 3,920,877
395 3,920,658
437 3,920,878
474 3,920,879
500 3,920,880
526 3,920,881
539 3,920,882

**CLASS 431**

78 3,920,375
79 3,920,376
115 3,920,377
202 3,920,378

| 276 3,920,379 | CLASS 432 2 3,920,380 | 80 3,920,381 | 209 3,920,382 | 223 3,920,383 | |
|---|---|---|---|---|---|

## Classification of Designs

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| D2— | 330 | 237,657 | | 199 | 237,672 | | 62 | 237,693 | | 55 | 237,709 | | ST | 237,726 | | 4B | 237,742 |
| D3— | 19A | 237,667 | D7— | 23 | 237,677 | | 64 | 237,691 | | 97 | 237,710 | | E | 237,725 | | D | 237,739 |
| | D | 237,658 | | 38 | 237,679 | | | 237,692 | | 112 | 237,711 | | J | 237,727 | D61— | 1F | 237,743 |
| D4— | 18 | 237,659 | | 43 | 237,676 | | 65 | 237,695 | | 141 | 237,712 | | 15AC | 237,728 | | | 237,744 |
| D6— | 6 | 237,660 | | 179 | 237,678 | | 119 | 237,694 | D24— | 1D | 237,713 | D35— | 3A | 237,729 | D63— | | 237,745 |
| | 24 | 237,669 | | 189 | 237,675 | | 123 | 237,706 | | | 237,714 | | | 237,731 | D64— | 10 | 237,746 |
| | 26 | 237,664 | | 207 | 237,680 | D12— | 30 | 237,700 | D26— | 5C | 237,715 | | R | 237,730 | | 11A | 237,747 |
| | 56 | 237,671 | D8— | 8 | 237,683 | | 84 | 237,698 | | | 237,716 | D45— | 16A | 237,732 | D83— | 1F | 237,748 |
| | 63 | 237,670 | | 30 | 237,682 | | | 237,699 | | | 237,717 | | 19G | 237,733 | D87— | R | 237,750 |
| | 69 | 237,673 | | 274 | 237,681 | | 111 | 237,701 | | 12 | 237,718 | | L | 237,734 | | | 237,751 |
| | 85 | 237,665 | D9— | 10 | 237,688 | | 113 | 237,697 | | 13R | 237,719 | D47— | 6E | 237,735 | | | 237,752 |
| | | 237,668 | | 169 | 237,685 | | 162 | 237,702 | | 14A | 237,720 | D48— | 2 | 237,736 | | | 237,753 |
| | 88 | 237,666 | | 179 | 237,686 | | 211 | 237,703 | D27— | 42 | 237,721 | D49— | 9.1 | 237,737 | | | 237,754 |
| | 130 | 237,674 | | 192 | 237,687 | D18— | 2R | 237,704 | D28— | 1B | 237,722 | D55— | 1B | 237,738 | | | 237,755 |
| | 139 | 237,663 | | 216 | 237,684 | D19— | 45 | 237,705 | D29— | 23A | 237,723 | D56— | R | 237,740 | | 5G | 237,749 |
| | 192 | 237,661 | | 267 | 237,689 | D22— | 28 | 237,707 | D30— | 6 | 237,690 | | 2 | 237,741 | D96— | 12F | 237,756 |
| | 197 | 237,662 | D10— | 21 | 237,696 | D23— | 35 | 237,708 | D34— | 5PC | 237,724 | | | | | | |

## Classification of Plants

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| P. — | 43 | 3,806 | P. — | 68 | 3,805 | P. — | 69 | 3,807 | | | |

# GEOGRAPHICAL INDEX OF RESIDENCE OF INVENTORS

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(First number in listing denotes location according to above key. Refer to patent number in body of the Official Gazette to obtain details as to inventor name, location, etc.)

## PATENTS

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | 3,920,012 | 3,920,011 | 3,920,617 | | 3,921,211 | | 3,920,365 | 3,919,776 |
| | 3,920,673 | 3,920,022 | 3,920,652 | | 3,921,212 | | 3,920,389 | 3,919,823 |
| | 3,920,912 | 3,920,030 | 3,920,654 | | 3,921,220 | | 3,920,442 | 3,919,827 |
| 1 : | 3,920,413 | 3,920,048 | 3,920,672 | 8 : | 3,919,820 | | 3,920,477 | 3,919,859 |
| | 3,920,796 | 3,920,058 | 3,920,778 | | 3,919,824 | | 3,920,578 | 3,919,889 |
| | 3,920,858 | 3,920,067 | 3,920,787 | | 3,920,076 | | 3,920,600 | 3,919,893 |
| | 3,921,027 | 3,920,073 | 3,920,791 | | 3,920,126 | | 3,920,623 | 3,919,907 |
| 4 : | 3,919,785 | 3,920,074 | 3,920,811 | | 3,920,179 | | 3,920,670 | 3,919,916 |
| | 3,919,803 | 3,920,084 | 3,920,816 | | 3,920,195 | | 3,920,721 | 3,919,937 |
| | 3,919,903 | 3,920,096 | 3,920,824 | | 3,920,433 | | 3,920,793 | 3,919,967 |
| | 3,919,996 | 3,920,128 | 3,920,827 | | 3,920,545 | | 3,921,154 | 3,919,979 |
| | 3,919,997 | 3,920,133 | 3,920,830 | | 3,920,940 | 12 : | 3,919,731 | 3,920,001 |
| | 3,920,208 | 3,920,149 | 3,920,851 | | 3,921,002 | | 3,919,801 | 3,920,002 |
| | 3,920,244 | 3,920,157 | 3,920,855 | | 3,921,177 | | 3,919,885 | 3,920,007 |
| | 3,920,266 | 3,920,168 | 3,920,873 | 9 : | Re.28,616 | | 3,919,910 | 3,920,010 |
| | 3,920,302 | 3,920,174 | 3,920,886 | | 3,919,736 | | 3,919,998 | 3,920,016 |
| | 3,921,000 | 3,920,175 | 3,920,905 | | 3,919,772 | | 3,920,008 | 3,920,017 |
| | 3,921,011 | 3,920,192 | 3,920,911 | | 3,919,786 | | 3,920,015 | 3,920,018 |
| | 3,921,178 | 3,920,199 | 3,920,913 | | 3,919,789 | | 3,920,106 | 3,920,019 |
| | 3,921,200 | 3,920,201 | 3,920,925 | | 3,919,840 | | 3,920,298 | 3,920,036 |
| | 3,921,218 | 3,920,215 | 3,920,930 | | 3,919,851 | | 3,920,301 | 3,920,045 |
| 6 : | Re.28,615 | 3,920,237 | 3,920,936 | | 3,920,060 | | 3,920,335 | 3,920,050 |
| | Re.28,619 | 3,920,243 | 3,920,963 | | 3,920,120 | | 3,920,374 | 3,920,056 |
| | 3,919,768 | 3,920,259 | 3,920,974 | | 3,920,148 | | 3,920,394 | 3,920,059 |
| | 3,919,777 | 3,920,264 | 3,920,975 | | 3,920,158 | | 3,920,780 | 3,920,082 |
| | 3,919,788 | 3,920,273 | 3,920,986 | | 3,920,165 | | 3,920,862 | 3,920,088 |
| | 3,919,793 | 3,920,278 | 3,920,987 | | 3,920,263 | | 3,920,907 | 3,920,095 |
| | 3,919,795 | 3,920,285 | 3,920,991 | | 3,920,267 | | 3,921,100 | 3,920,099 |
| | 3,919,807 | 3,920,297 | 3,920,993 | | 3,920,312 | | 3,921,122 | 3,920,101 |
| | 3,919,822 | 3,920,339 | 3,920,994 | | 3,920,328 | | 3,921,169 | 3,920,105 |
| | 3,919,825 | 3,920,416 | 3,921,003 | | 3,920,341 | | 3,921,210 | 3,920,115 |
| | 3,919,841 | 3,920,421 | 3,921,012 | | 3,920,342 | 13 : | 3,919,794 | 3,920,207 |
| | 3,919,857 | 3,920,425 | 3,921,033 | | 3,920,366 | | 3,919,886 | 3,920,246 |
| | 3,919,881 | 3,920,437 | 3,921,044 | | 3,920,384 | | 3,919,896 | 3,920,286 |
| | 3,919,882 | 3,920,467 | 3,921,047 | | 3,920,417 | | 3,919,901 | 3,920,305 |
| | 3,919,897 | 3,920,476 | 3,921,075 | | 3,920,503 | | 3,919,969 | 3,920,315 |
| | 3,919,902 | 3,920,481 | 3,921,085 | | 3,920,504 | | 3,920,206 | 3,920,320 |
| | 3,919,909 | 3,920,482 | 3,921,092 | | 3,920,514 | | 3,920,248 | 3,920,332 |
| | 3,919,914 | 3,920,490 | 3,921,095 | | 3,920,524 | | 3,920,262 | 3,920,370 |
| | 3,919,915 | 3,920,494 | 3,921,099 | | 3,920,525 | | 3,920,411 | 3,920,376 |
| | 3,919,918 | 3,920,537 | 3,921,101 | | 3,920,553 | | 3,920,498 | 3,920,422 |
| | 3,919,920 | 3,920,548 | 3,921,119 | | 3,920,853 | | 3,920,529 | 3,920,453 |
| | 3,919,922 | 3,920,562 | 3,921,121 | | 3,920,943 | | 3,920,848 | 3,920,471 |
| | 3,919,928 | 3,920,571 | 3,921,125 | | 3,920,970 | | 3,920,929 | 3,920,500 |
| | 3,919,932 | 3,920,572 | 3,921,145 | | 3,921,015 | 16 : | 3,919,743 | 3,920,511 |
| | 3,919,936 | 3,920,576 | 3,921,171 | | 3,921,041 | | 3,920,423 | 3,920,523 |
| | 3,919,939 | 3,920,579 | 3,921,174 | | 3,921,066 | 17 : | Re.28,618 | 3,920,546 |
| | 3,919,950 | 3,920,584 | 3,921,176 | | 3,921,068 | | 3,919,724 | 3,920,552 |
| | 3,919,958 | 3,920,589 | 3,921,181 | | 3,921,096 | | 3,919,729 | 3,920,581 |
| | 3,919,991 | 3,920,590 | 3,921,196 | | 3,921,191 | | 3,919,730 | 3,920,592 |
| | 3,919,999 | 3,920,591 | 3,921,202 | 10 : | 3,920,334 | | 3,919,734 | 3,920,599 |

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56 : 3,919,995

## DESIGN PATENTS

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 237,694 | | 237,729 | | 237,664 | | 237,736 | | 237,710 | 43 | 237,733 |
| 4 | 237,706 | | 237,730 | | 237,672 | 26 | 237,693 | | 237,731 | 44 | 237,667 |
| | 237,723 | | 237,749 | | 237,681 | | 237,698 | | 237,740 | | 237,732 |
| 6 | 237,657 | | 237,752 | | 237,684 | | 237,699 | | 237,747 | | 237,734 |
| | 237,665 | 8 | 237,722 | | 237,703 | | 237,738 | 37 | 237,717 | 47 | 237,697 |
| | 237,668 | | 237,737 | | 237,727 | 27 | 237,695 | 39 | 237,679 | 48 | 237,690 |
| | 237,674 | 9 | 237,696 | | 237,751 | | 237,715 | | 237,707 | | 237,713 |
| | 237,691 | | 237,700 | 18 | 237,670 | | 237,718 | 42 | 237,678 | | 237,753 |
| | 237,692 | | 237,725 | | 237,712 | 32 | 237,724 | | 237,683 | | 237,756 |
| | 237,701 | 13 | 237,754 | 20 | 237,750 | 34 | 237,687 | | 237,704 | 50 | 237,705 |
| | 237,702 | | 237,755 | 21 | 237,741 | 36 | 237,661 | | 237,719 | 51 | 237,666 |
| | 237,709 | 16 | 237,660 | 24 | 237,748 | | 237,677 | | 237,745 | | 237,680 |
| | 237,714 | 17 | 237,659 | 25 | 237,689 | | | | | | |

## PLANT PATENTS

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|---|---|---|---|---|---|---|---|
| 6 | 3,806 | 41 | 3,805 | | | | |

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U.S. DEPARTMENT OF COMMERCE
Rogers C. B. Morton, *Secretary*

PATENT AND TRADEMARK OFFICE
C. Marshall Dann, *Commissioner*